

ENRICHED TEACHING OF SCIENCE  
IN THE HIGH SCHOOL

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# Enriched Teaching of Science In the High School

A SOURCE BOOK FOR TEACHERS OF GENERAL SCIENCE,  
BIOLOGY, PHYSICS, CHEMISTRY, AND OTHER SCIENCES,  
LISTING CHIEFLY FREE AND LOW COST ILLUSTRATIVE  
AND SUPPLEMENTARY MATERIALS

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## PREFACE

The increasing demand that school activities be related to the everyday life of pupils has resulted in the necessity of providing the means for investigation along the lines of individual interests. Consequently, in every high school subject there is an urgent need for an extensive guide to sources of supplementary and enrichment materials which may be obtained at low cost. This is particularly true in the field of science.

Many administrators interested in science teaching, as well as many science teachers themselves, feel that much of the so-called laboratory work in schools is sterile, and that there is a real need of avoiding both bookishness and a formalized laboratory procedure in science courses. It is for the purpose of meeting this need that this handbook has been written.

The compilers have examined the greater part of the materials listed, most of which are accessible in the department of Secondary Education of Teachers College, Columbia University. The items have all been used in the classroom or appraised elsewhere in print.

Names of publishers, addresses, prices, etc., have been checked to date, but it should be kept in mind that these details are constantly changing. It is wise, therefore, to verify prices before ordering. Much of the material listed is offered free for classroom use. In regard to requests for things of this type a few general suggestions may be of value. It is best to order only material for which there is a real need, specifying the name of the sample, chart, or booklet which can be used and the name of the class which will use it, rather than to make a blanket request for "all the pamphlets issued by your firm for science classes." Better results will be obtained if the school letterhead is used and if the teacher signs the letter. When the material arrives, it is only fair to the sender that it be acknowledged, at least with a post card. Seeming discourtesy, carelessness, or abuse of materials has led certain companies to become cautious about sending materials to schools, and in some cases to discontinue the service entirely.

Objection is sometimes raised to the using of free booklets, since they are likely to be of the nature of propaganda, which

has come to mean biased fact and opinion. Much, however, that our pupils are reading in newspapers, magazines, advertisements, and even books is propaganda; and who better than the science teacher can train pupils "to weigh and consider," to demand facts, and to form their own conclusions based on evidence? Thus, entirely aside from the rich fund of facts that may be mined in them, free pamphlets present a challenging experience in living both to teacher and to pupil.

A teacher of any science subject, especially a teacher of general science, will undoubtedly find material of value in all the sectional divisions of this handbook. The attempt has been made to compile a fairly comprehensive list of the best available enrichment materials in teaching the high school sciences. The authors will be greatly indebted to anyone who points out errors that may be found, whether they are errors in statement of fact, or in listing material of little value (a real danger), or in omitting anything that is important.

A feature which should make this compilation especially useful is the annotation of the items. This has been done with the intention of making it possible for the user to know the nature of the material, so that from a wide selection it will be possible to choose what best suits the particular needs of the case.

This list is by no means exhaustive. A blank page is inserted at the end of each division in order that notes and new materials may be added from time to time, thus making the handbook an ever-growing, accumulative "worklist." Teachers will find many suggestions for additional materials in the advertising sections of magazines. In order that newly discovered materials may reach other science teachers, the compilers request that new and worthwhile sources and proved devices be called to their attention. These suggestions will be organized and published as a supplement to this handbook.

It would have been an endless, if not impossible, task to collect the amount and kind of materials listed herein without the assistance and coöperation of science teachers who have been members of Education Courses 35A, 36A, 235F, 236F, S235G, S235F, and Em236 (High School Methods), at Teachers College, Columbia University. The compilers acknowledge their indebtedness to these students; to high school pupils who have assisted in preparing the manuscript; to many librarians who gave valuable suggestions and information; to

the publishers who submitted materials for examination; to the universities and state and federal agencies which supplied bulletins and handbooks; and to associations and commercial firms who through us announce free materials for teachers.

Acknowledgment is gratefully made to Dr. S. R. Powers, Professor of Natural Sciences, Teachers College, Columbia University; to Dr. Gerald S. Craig, Associate in Natural Sciences, Teachers College, Columbia University; and to Mr. C. J. Pieper, Assistant Professor of Education, New York University, for their valuable criticisms and suggestions.

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*Teachers College,  
Columbia University,  
July 23, 1928.*

#### AN APPROPRIATE CAUTION

Quoted by permission from *Popular Books in Science* of the American Library Association:

"The user of this list may well be reminded at the outset that the field of science cannot be sharply divided into little compartments labelled 'chemistry,' 'botany,' and the like. On the contrary, there is but one vast field of human knowledge, and facts concerning any part of that field have a bearing on every other part. The usual subdivisions, which are those employed here, are not fundamental; they are largely accidental and have arisen merely as a matter of human convenience."



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## I. MODELS, SAMPLES, EXHIBITS

The ideas and impressions that a student carries away from a science course are undoubtedly most vivid and real when the textbook account has been made more significant by the actual use of a model, an exhibit, or a sample of the subject under discussion. It is not to be wondered at, then, that the use of these three types of enrichment material is widespread. This section attempts to bring together sources of free and inexpensive material of this nature.

There is one field that this report does not and probably could not cover—that of homemade models and exhibits. It is an excellent form of project for a student to make a model of some recent engineering achievement, or to arrange an exhibit to show the stages of some chemical process, or the life history of, say, a frog. During the past year, in one high school, different members of the physics classes constructed an excellent model of the Hudson vehicular tunnel; a model, with power houses and transformer stations, to show the various voltage transformations through which the electric current passes in reaching the homes of the community; a model to show the difference between "open" and "BX" wiring, and the methods of installation; and two compartments, identical in size and equipped with lights of the same wattage in the same relative position, but with one interior painted black, the other white, to show the difference in resulting illumination. Although not many students have the knack for this work, in any class there are always a few mechanically inclined who would be glad to undertake this sort of thing for extra credit, in place of a more conventional experiment, or simply for the joy of doing it. Not only does that individual add something of value to the science equipment, but he also is adding a great deal to his own experience.

In the comments which accompany each item, *free* means that the material is given outright; a price indicates the price of outright purchase. When material is lent, transportation will have to be paid by the borrower, as a general rule, in at least one direction.

## A. GENERAL SCIENCE AND BIOLOGY

### Foods

**Chocolate and Cocoa.** Hershey Chocolate Co., Hershey, Pa.  
Free to schools.

Set of 7 bottles showing the cocoa bean, its parts and products.

**The Common Barberry Bush.** Conference for the Prevention of Grain Rust, 510 McKnight Bldg., Minneapolis, Minn.  
Free.

A specimen (twig) of "the grain farmer's worst enemy" put up in an envelope with celluloid front. Shows the cluster-cup stage of the black stem rust. Charts also obtainable.

**Coffee from Plantation to User.** C. F. Blanke Tea and Coffee Co., 7th and Clark Ave., St. Louis, Mo. Free.

Set of 25 bottles of specimens showing the types of raw bean and the various processes of preparation.

**Corn Products.** Associated Corn Products Manufacturers, 208 So. LaSalle St., Chicago, Ill. 50c postpaid.

Set of 10 three-ounce bottles containing samples of the corn grain and such products as corn meal, starch, cooking oil, etc.

**Corn Products.** Corn Products Refining Co., Edgewater, N. J. Free.

Set of 12 bottles containing specimens of the products of maize (Indian corn). Also larger set of 25 bottles for colleges and libraries.

**Flour.** Russell-Miller Milling Co., Minneapolis, Minn. Free.

Exhibit on flour manufacture. Vials of wheat, bran, and different kinds of flour.

**Wheat to Flour.** Northwestern Consolidated Milling Co., Minneapolis, Minn. Free.

24 samples of wheat in various stages of manufacture into flour.

**Wheat to Flour.** Hecker-Jones-Jewell Milling Co., 40 Corlears St., New York City. Free.

An excellent display card with 5 small vials of samples, and a map showing wheat-raising regions.

Also pamphlet "Adventures of a Grain of Wheat."

**Grains and Grasses.** Commissioner of Immigration, Winnipeg, Canada. Free.

Box of samples of various cereal crops.

**Horlick's Malted Milk.** Horlick's Malted Milk Corp., Racine, Wisc. Free.

Set of 12 bottles of raw materials and products, accompanied by descriptive booklets.

**Packing-House By-Products.** Morris and Co., Advertising Dept., Chicago, Ill. Free.

Samples of tallow, glue, and other by-products of the meat packing industry.

**Peanut Butter.** Beech-nut Packing Co., Canajoharie, N. Y. Free.

An exhibit showing the substances used and the stages in the manufacture of peanut butter.

**Rolled Oats.** Armour Grain Co., 208 South LaSalle St., Chicago, Ill. Free.

The conversion of farm oats into the finished product.

**Spice Samples.** D. L. Slade Co., 189 State St., Boston, Mass. Free.

Card with 37 bottles of spice samples, seeds, etc., each labelled.

**What Milk Is.** Sheffield Farms Co., 524 West 57th St., New York City. Free.

A cardboard quart milk bottle showing the proportions of the substances of which milk is composed, and the total caloric value.

### Fabrics

**Flax Manufacture.** Barbour Products Co., 96 Franklin St., New York City. ~~Free.~~ \$3.00 AND TRANSPORTATION

Cabinet showing full process of flax manufacture with actual specimens.

**Silk Culture Cabinet.** Corticelli Silk Mills, Florence, Mass. \$2.00 to schools.

Box of cocoons and silk culture chart, free. Same specimens mounted on cards, 56c.

**Silk Specimen Exhibits.** H. K. H. Silk Co., 120 East 16th St., New York City. No. 1, \$2.50. No. 2, \$1.00.

Each set contains all the life stages of the moth as well as the steps in the manufacture of silk thread. Each is accompanied by a booklet of explanations.

**Silk Worm Eggs.** T. A. Kelleher, P. O. Box 82, Washington, D. C. 300 for 25c.

Will grow into real silk worms. Useful for biology classes.

**Steps in the Manufacture of Esmond Blankets.** Esmond Mills, Esmond, R. I. Free.

A neat little case with specimens showing six steps in the process.

### Miscellaneous

**Collection of Specimens.** U. S. National Museum, Washington, D. C. Free.

At times, upon written request of the principal, special collections can be supplied to schools. Write for particulars, asking about a specific collection, such as fossils, fishes, etc.

**Rack of Wood Samples.** National Lumber Manufacturers' Association, Transportation Bldg., Washington, D. C. \$10.00, f.o.b. Chicago.

Contains 32 smoothly dressed samples,  $\frac{3}{4}$ "x2 $\frac{1}{4}$ "x5", of native American hard and soft woods, with celluloid labels bearing common and scientific names.

**Samples of Hardwoods.** Hardwood Manufacturers' Institute, Memphis, Tenn. \$5.00.

Box of about 45 pieces of hardwood, each labelled with name and special qualities of the wood.

**Drug Samples.** Victor Lewitus, College of Pharmacy, 113 West 68th St., New York City. Send postage.

Samples of plant parts—berries, bark, roots, etc.—used as drugs, such as digitalis, gum arabic, etc., will be sent for postage. Send addressed envelope for list.

**Sponge Samples.** Schroeder and Tremayne, Inc., 500 North Commercial St., St. Louis, Mo. Free.

Also leaflet, "Men Who Fight Sharks." This company desires to coöperate with schools. Write for particulars.

**Animal Track Series.** U. S. Rubber Co., 1790 Broadway, New York City.

Footprints of many different animals, made directly from the paws of animals, pressed into soft clay. Individual prints of smaller animals, 35c; of the elk, bear cub, wolf, etc., 50c each; and of the buffalo, 75c. Three cases also obtainable.

Case No. 1 contains 11 prints of pack rat, gopher, prairie dog, raccoon, coyote, squirrel, wild cat, mountain sheep, wolf, \$5.00.

Case No. 2—ground squirrel, red squirrel, opossum, skunk, porcupine, mink, bear cub, 10 prints in all, \$5.00.

Case No. 3—woodchuck, kit fox, red fox, badger, otter, white tail deer, black tail deer, antelope, goat, badger, elk, beaver, 15 prints in all, \$6.40.

**The Herediscope.** American Instrument Co., 1220 D St., N. W., Washington, D. C.

Bulletin No. 1105 describes this instrument board with which to teach genetics.

## B. CHEMISTRY

### General

**Ready Reference Rule.** Henry Heil Chemical Co., St. Louis, Mo. 30c each. \$3.00 per dozen. \$20.00 per hundred.

Comparison of Metric and English rules. Also of F. and C. temperature scales and a list of the principal elements with atomic weights and valences. 6" long.

**Demonstrating Slide Rule.**

See comment under heading "Miscellaneous" in PHYSICS Section (p. 16).

### Aluminum

**Aluminum Cooking Utensil Co.,** New Kensington, Pa. Free.

An envelope containing samples of aluminum plate. Other materials also available.

**Evolution of a "Mirro" Aluminum Clothes Sprinkler.** Aluminum Goods Manufacturing Co., Manitowoc, Wisc. Free.

Interesting exhibit tracing evolution from bauxite, through refining processes to the drawing, trimming, shaving, and polishing of the sprinkler. Size, 16"x24". Exhibit accompanied by eight-page booklet entitled, "From Clay to Cooking Utensil."

**American Bauxite Co.,** Pittsburgh, Pa. Free.

Samples of bauxite ore, aluminum powder, and aluminum ingot.

**Corundum.** Norton Co., Worcester, Mass. Free.

A well-made case, containing grinding wheels and other products made of corundum.

### Calcium

**American Lime and Stone Co.,** Bellefonte, Pa. Free.

Samples of "Bell Mine" limestone and pebble lime.

**The Permutit Co.,** 440 Fourth Ave., New York City. Free.

This company will send a demonstrating tube by means of which the instructor can demonstrate on the lecture table softened water from any hard water.

**U. S. Gypsum Co.,** 300 West Adams St., Chicago, Ill. Free.

Samples of Gyplap, Thermofill, Rocklath, and other gypsum products.

### Carbon

**Manufacture of a Lead Pencil.** Eberhard Faber, 37 Greenpoint Ave., Brooklyn, N. Y. 50c.

Set showing manufacture of pencil and eraser. Is mounted with actual samples of the crude and finished materials. Size, approximately, 17"x22".

**Manufacture of Fountain Pen.** L. E. Waterman Co., 191 Broadway, New York City. Free.

Process of the manufacture of Waterman pens. Shows in particular samples of rubber at the various stages of manufacture.

**Ace Combs of Hard Rubber.** American Hard Rubber Co., 11 Mercer St., New York City. Free to schools.

Set of 10 samples showing the stages in the manufacture from crude rubber to comb.

**Firestone Tire and Rubber Co.,** Advertising Dept., Akron, Ohio. Free.

Samples of raw materials and various products.

**From Raw Material to Finished Product.** Goodrich Rubber Co., Akron, Ohio. Free.

Six samples and several pictures of the processes of rubber manufacture.

**Educational Exhibit.** Hood Rubber Products Co., Watertown, Mass. 60c to schools.

This exhibit shows samples of crude rubber and the various ingredients necessary to refine and manufacture it into rubber boots and shoes.

**Experimental Material.** Educational Dept., U. S. Rubber Co., Box 12, Station G, New York City. \$1.00.

All requisite materials and full instructions for an experiment to demonstrate the extraction of rubber from latex, and also a simple vulcanizing experiment. A wooden mill will be lent by the company free of charge. A small box of samples of crude rubber will be supplied for 25c.

**Rubber Display.** Goodyear Tire and Rubber Co., Akron, Ohio. No. 1, \$5.00; No. 2, \$25.00.

Send for leaflet picturing and describing these sets, which consist of specimens of raw materials and finished products.

**Standard Carbon Brush Exhibit.** Stackpole Co., St. Marys, Pa. Free.

Various types and sizes of standard carbon motor brushes, mounted on an exhibit board. Also will send catalogs as reference books.

### Chromium

**International Nickel Co.,** 67 Wall St., New York City. Free.

Set of samples illustrating the various stages of production of Monel metal and pure nickel. Valuable material.

### Fuels and Flames

**Paraffin Paint Co.,** San Francisco, Cal. Free.

Set of samples of products.

**The Quaker State Oil Refining Co.,** Oil City, Pa. Free.

Set of 8 bottles showing different types of Quaker State oil.

**School Samples.** Sinclair Refining Co., 45 Nassau St., New York City. Free.

An assortment of bottles showing all grades of oil from crude to refined Bottles 6½" tall.

### Iron

**Alleghany Metal.** Alleghany Steel Co., Brackenridge, Pa. Free

A sample, and descriptive bulletin on chrome-iron, which is one of the kinds of "stainless steel"

**Raw Material Exhibit.** The Carter Ink Co., Boston, Mass. Free.

Contains 12 small bottles holding ingredients used in ink making Packed in a permanent display box. A map of the world under cover shows places where the materials are obtained.

**Duriron Sample Bar and Fitting.** Duriron Co., Inc., Dayton, Ohio Free.

Duriron is a material for laboratory use which is acid resistant. Samples sent upon request.

**Process Card.** The Esterbrook Steel Pen Manufacturing Co., Camden, N. J. Free.

Shows the various stages in the manufacture of steel pens from sheet steel to the finished product. Set of small booklets accompanies the card.

**Process Card.** Spencerian Pen Co., 349 Broadway, New York City. Free.

An 8"x12" card showing the various processes in manufacturing steel pens.

### Nitrogen Family

**Ammunition.** Remington Arms Co., Woolworth Bldg., New York City. Free.

Shows parts of shot, shell, and cartridge in stages of manufacture.

**Grinnell Automatic Sprinkler Head.** Grinnell Co., Inc., Providence, R. I. Free.

This company will send Grinnell Sprinkler Head complete. One not assembled and one in cross-section. Interesting material.

**Kalle and Co., Inc.,** 580 Canal St., New York City. Free.

Silk samples of all kinds and colors.

**Silk Association of America,** 468 Fourth Ave., New York City. Free.



Samples of different stages in the production of silk, beginning with the cocoon. Only one exhibit to a school, but accompanying it is a booklet describing the manufacture of silk, of which enough for each student will be furnished.

### Organic Chemistry

**American Sugar Refining Co.,** 117 Wall St., New York City. Loan.

Exhibit of various types of raw and refined sugar.

**Dupont Fibre Silk Co.,** Niagara Falls, N. Y. Free.

Samples of artificial silk and the materials used in its manufacture.

**Soap: Its Origin, Manufacture and Use.** Colgate and Co., 105 Hudson St., Jersey City, N. J. \$2.00.

This exhibit consists of a box containing soap ingredients in sealed and labelled bottles, a box of soap products, a chart 29"x39" in color, and 25 copies of a supplementary reader.

**Kirkman and Son,** Brooklyn, N. Y. Free.

Set of 8 four-inch bottles showing the raw materials entering into the manufacture of soap.

**Larkin Co.,** Advertising Dept., Buffalo, N. Y. Free.

Bottles showing raw materials from which soap is made, and stages of manufacture.

**Lever Bros.,** Cambridge 39, Mass. Free.

An exhibit divided into 3 groups—raw materials, intermediate products, and end products. Good material on soap manufacture.

**Palmolive Co.,** 42-60 Fourth Ave., Milwaukee, Wisc. Free.

An exhibit showing the manufacture of soap from raw materials.

**Educational Exhibit.** Procter and Gamble, Educational Dept., Cincinnati, Ohio. Free.

Consists of 7 panels, dealing with manufacture and use of soap. Can be had upon request by school superintendent. Also 4 ten-ounce bottles showing raw materials, \$5.00.

**Industrial Wood Fibre Co.,** Cleveland, Ohio. Free.

Samples of artificial silk.

**Tubize.** Tubize Artificial Silk Co., 303 Fifth Ave., New York City. Free.

Skins of the different yarns manufactured by this company.

**Derivatives of Oils, Citronella: Java and Ceylon.** Magnus Mabce and Reynard, Inc., 32 Cliff St., New York City. Free.

Set of 19 samples of derived products, accompanied by an explanatory chart.

**Sealo.** American Chemical Products Co., 7 Litchfield St., Rochester, N. Y. Free.

Sample tube of a product useful in insulating electric wires, together with descriptive pamphlet.

**Armstrong Cork Co.,** Lancaster, Pa. Large size, \$5.00. Small size (same ingredients in smaller quantities), \$1.00.

Educational exhibit showing raw materials used in making linoleum.

**Karolith Samples.** Karolith Corp., 2125 44th Road, Long Island City, N. Y. Free.

A plastic product with uses similar to those of celluloid. Accompanied by a booklet.

**School Exhibit.** Russia Cement Co., Gloucester, Mass. Free.

Set of 8 bottles of raw materials and the finished product, Le Page's liquid glue

### Precious Metals

**Holmes and Edwards Super Plate.** International Silver Co., Bridgeport, Conn. Free.

A 12"x15" plaque showing five stages in the manufacture of a silver plated spoon.

**Fansteel Product Co., Inc.,** North Chicago, Ill. Free.

An exhibit of tantalum and other rare metals, with descriptive data.

### Silicon

**Stone Samples.** The Alberene Stone Co., 153 West 23rd St., New York City. Free.

Two small samples: one is a block about 3"x5"; the other shows the use of this stone in joints.

**Display of Cement Manufacture.** Alpha Portland Cement Co., 13 South St., Easton, Pa., or 165 West Wacker Drive, Chicago, Ill. Free.

Bottles of cement rock, ground raw material, clinker, gypsum, and the finished Alpha Cement in a display rack.

**The Story of a Bag of Brixment.** Louisville Cement Co., Louisville, Ky. Free.

A box, 5"x13", containing 6 compartments, showing the various stages in manufacture of this product.

**Universal Portland Cement Co.** Frick Building, Pittsburgh, Pa., or 210 South LaSalle St., Chicago, Ill. Free.

Set of 6 bottles, 4" tall, containing samples of raw materials and finished product.

**Educational Exhibit.** Plate Glass Manufacturers of America, First National Bank Bldg., Pittsburgh, Pa. Free.

Set of 6 bottles of materials showing stages in the manufacture of glass.

**Illinois Glass Co.,** Alton, Ill. Free.

An exhibit of raw materials used in the manufacture of glass.

**Carborundum Exhibit.** The Carborundum Co., Niagara Falls, N. Y. Free.

This exhibit contains samples of raw materials, crude carborundum as it comes from the furnace, and the finished product. Requests must come from teachers on school stationery.

### Sodium and Potassium

**Church and Dwight Co., Inc.,** 27 Cedar St., New York City. Free.

Will send samples of soda to schools requesting it. Booklets and pictures also available.

**Diamond Crystal Salt Co.,** St. Claire, Mich. Free.

They will furnish a limited supply of samples upon request. Small bottles and boxes.

**Salt Exhibit.** Worcester Salt Co., 71 Murray St., New York City.

Bottles of rock salt, ordinary salt, and Worcester salt—dry and brined.

**Potash Minerals and Products.** Agriculture and Scientific Bureau, N. Y. Potash Export My. of Amsterdam, Holland, 19 West 44th St., New York City. Free to teachers of agriculture.

This set of 6 small glass jars of ores and manufactured products from the French and German potash mines is occasionally available, depending on the supply from abroad.

### Sulphur

**Hammermill Paper Co.,** Erie, Pa. Free.

Set of 4 glass flasks containing pulp in the various stages of refining. Distributed only to larger high schools. Will also send a box containing samples of many kinds of paper

**Strathmore Paper Co.,** Mittineague, Mass. \$1.00.

A paper-making exhibit. Raw materials, stages of manufacture, and types of paper.

### Tin and Lead

**Carter White Lead Co.,** West Pullman Station, Chicago, Ill. Free.

Samples of blue lead, partly corroded white lead, etc. Good for demonstration work.

### Zinc Family

**School Exhibit on Asbestos.** Keasby and Mattison Co., Ambler, Pa. Free.

An interesting exhibit on asbestos and the products made from it.

**Asbestos Samples.** Powhatan Mining Corp., 214 Equitable Bldg., Baltimore, Md. Free.

Samples of the raw material and the manufactured products. Also descriptive leaflets.

**E. H. Sargent and Co.,** 155 East Superior St., Chicago, Ill. Free.

Asbestos sample, on black paper.

**C. PHYSICS****Electricity****BATTERIES**

**B-4. Cut-away Cell.** Edison Storage Battery Co., Orange, N. J. \$11.75.

A beautiful cut-away section of this cell. If request is approved by management, free.

**The Electric Storage Battery Co.,** Philadelphia, Pa. Free.

A cut-away Exide battery. Shows details of construction. Very valuable exhibit.

**Cut-away Dry Cell.** National Carbon Co., New York City. Free.

A regular Columbia Dry Cell, a portion of which has been cut away to show the internal construction.

**Oxo. Oxide Battery Co.,** 1485 Marshall Ave., St. Paul, Minn. Free.

A sample package of this material for cleaning battery plates.

**HEATING**

**Fuses.** Bussmann Mfg. Co., University and Jefferson Sts., St. Louis, Mo. Free or loan.

Samples of three types of fuses—clear window-plug fuse, renewable fuse, and non-renewable fuse.

**INSTRUMENTS**

**Jewell Electrical Instrument Co.,** 1640 Walnut St., Chicago, Ill. Loan.

Arrangements can probably be made by which an exhibit of instruments may be borrowed from this company.

**TELEPHONE AND TELEGRAPH**

**New Jersey Telephone Co.,** Commercial Exchanges, and **American Telephone and Telegraph Co.,** 195 Broadway, New York City. Loan.

No. 1. The Parts of the Telephone. No. 2. Cable Display.  
Very good material.

## WIRING

**Curtistrip.** Curtiss Lighting, Inc., 1110 West Jackson Blvd., Chicago, Ill. Free.

This is a wiring device constructed of 20-gauge steel, 2½" wide and provided with a flat cover of the same material. Particularly designed for show windows. One sample to a school, with booklet describing the device.

## Heat

## CONDUCTION

**Aluminum Cooking Utensil Co.,** New Kensington, Pa. Free.

An envelope containing an aluminum and an iron rod designed to show the better conductivity of aluminum.

## HEATING SYSTEMS

**Cut-away Steam Trap.** The Trane Co., La Crosse, Wisc. Free.

This trap can be attached to a steam connection and by blowing on the bellows can be made to show the sensitiveness of the bellows member.

## ENGINES

**Engine.** Wright Aeronautical Corp., Paterson, N. J. Loan.

If all liability for damage up to \$5,000 is assumed, a Wright Engine can be borrowed for a day or two. Request must come some time in advance of day for which it is wanted. A dummy engine may be borrowed for a few days without assumption of the liability.

**Carburetors.** Zenith Detroit Corp., Hart Ave., Detroit, Mich.

Complete carburetors at 50% discount. In cut-away sections, at list price.

## INSULATION

**The Celotex Co.,** 645 North Michigan Ave., Chicago, Ill. Free.

This company will send samples of Celotex Standard Building Board, plaster on Celotex, and Celotex Industrial Board.

**U. S. Gypsum Co.,** 300 West Adams St., Chicago, Ill. Free.

Will send samples of Sheetrock, Thermofill, and other of their products.

## METERS

**American Meter Co.**, 105 West 40th St., New York City.

Gas Meter Demonstration Models can be obtained at various prices.

## REFRIGERATION

**Wall-Section.** Leonard Refrigerator Co., Grand Rapids, Mich. Free.

A 2-inch wall section showing the construction of the Leonard refrigerator.

## THERMOMETERS

**The Making of an Accurate Thermometer.** Taylor Instrument Co., Rochester, N. Y. Loan.

Seventeen actual samples and photographs, from tube of the glass thermometer to the completed instrument. Address School Division.

## Light

## LIGHTING

**Celestialite Glass.** Gleason-Tiebout Glass Co., 200 Fifth Ave., New York City. Free.

Specially prepared glass for lighting fixtures. It is made of layers of glass of three colors.

## Mechanics

## AIR PRESSURE

**Aero Alarm Co.**, 56 West 45th St., New York City. Loan.

Working model of Fire Alarm System operated by air pressure.

## FORCES

**The Mocar Monoplane.** Mount Carmel Mfg. Co., Mt. Carmel, Conn. \$1.00.

A model airplane that actually flies. Parts to be assembled by the purchaser.

## METRIC SYSTEM

**Metric Association**, 156 Fifth Avenue, New York City.

This association will lend meter bar, kilogram weight, and liter measure.

**Miscellaneous**

**Demonstrating Slide Rule.** Keuffel and Esser Co., 127 Fulton St., New York City. \$8.00.

Demonstrating Slide Rule No. 100. Ten feet long and yet made well enough to work problems accurately. Ideal for teaching the slide rule.

**Eugene Dietzgen Co.,** 218 East 23rd St., New York City.

Pantographs, graph paper, and similar supplies.

**Folding Calculator.** Wetherill's Specialties, Audubon, Pa. \$2.00.

A special type of labor saver for the same purposes as a slide rule. Larger sizes and many other devices manufactured by the same company.

**Midget Slide Rule.** Gilson Slide Rule Co., Stuart, Fla. \$1.50.

Made of aluminum with scales of white celluloid. Circular shape. Can be used with the five slide rule methods.

**The Rotractor.** Rotractor Sales Co., 140 West 24th St., New York City. 50c.

A convenient instrument which combines compass, protractor, etc. It is used chiefly for making fancy designs.

**Trippensee Planetarium Co.,** 2679 East Grand Boulevard, Detroit, Mich.

Many kinds of models for showing the position and movements of the earth and other parts of the solar system.



**MODELS, SAMPLES, AND EXHIBITS.** (Add other materials in space below.)

## II. PICTURES, POSTERS, CHARTS

### A. THE BULLETIN BOARD

A bulletin board of generous proportions is an indispensable part of any science classroom or laboratory. Its uses are legion. One corner may be reserved for graphs to plot the standing of classes or of individuals. In the main it can be used as a clearing house for the pictorial aids in teaching the lesson; for clippings of science interest, which pupils should be encouraged to bring; or for exceptional project work done by members of the class. Experience shows that the use of illustrative material on the bulletin board in one class results in increased interest for all classes using that particular room.

Perhaps there is no more effective climax to a unit of work than the preparation of an exhibit as a class or committee project. Care should be taken, however, that the preparation of the exhibit does not become the goal rather than the unit itself. Further, one should guard against permitting any display to become stale. Once a week probably is not too often to make a change in material. When the exhibit is removed from the bulletin board, it should be filed for possible future use, a folder or manila envelope being provided for each unit. So far as it is practical, all these activities should be initiated, planned, and conducted by the students.

### Equipment

Bulletin boards may be made of burlap stretched on a frame, or of cork, linoleum, or compo-board. They can be obtained from supply companies (pp. 147-155) or they can be made in the school.

**Multiplex Display Fixture Co., 918 North Tenth St., St. Louis, Mo.**

This company deals in many types of equipment, including a slide cabinet for the care of lantern slides and bulletin boards of various types.

## B. MAKING AND USING CHARTS AND POSTERS

**Reproducing Original Charts and Graphs.** Louis Amber and Co., 9 East 38th St., New York City.

Will make photostat reproductions of charts, graphs, posters, etc., at 25c each. An excellent way to keep copies of interesting and unusual work done by pupils.

**Biology Charts.** H. J. Jurica in "Catholic School Interests," Oct. 1926. 178 Kenilworth Ave., Elmhurst, Ill.

Discusses the use of charts and gives hints on how each teacher can make his own.

**Health Posters from Hygeia.** The American Medical Association, 535 North Dearborn St., Chicago, Ill. Free.

Many small reproductions from the magazine "Hygeia," with suggestions for making and using posters. The report of a poster contest.

**Poster Contests and Their Educational Value.** The American Society for the Prevention of Cruelty to Animals, Dept. of Humane Education, 50 Madison Ave., New York City. Free.

A discussion of posters with suggested slogans. Accompanied by "The Poster Primer," which reproduces many posters done by school children. Also many leaflets on farm animals and pets, and booklets on humane education in "Nature Study," "Composition," "Poetry," and "Music."

**Posters in Chemistry.** Article by Fannie L. Bell. Journal of Chemical Education, Vol. V, pp. 157-67, Feb. 1928 and Mar. 1928. 19th and Northampton Sts., Easton, Pa. 35c per copy.

Projects actually worked out by a high school class are here described and examples are reproduced.

**Posters to Visualize Health,** in "Seeing Is Believing." American Child Health Association, 370 Seventh Ave., New York City. 12c.

A booklet on what posters are and how to make them, with examples.

**The Use of Charts in the Natural Sciences.** A. C. Noé. Science, June 8, 1928, pp. 571-74. Grand Central Terminal, New York City. 15c per copy.

An excellent review of available charts, especially from German sources.

**Charts for Civics, Geography, Arithmetic, and General Science.** Wheeler Publishing Co., 2831 South Park Way, Chicago, Ill. 1928. 60c.

A useful manual for training pupils in the use and construction of graphs and charts, giving many illustrations and problems.

**Poster Making in School.** Metropolitan Life Insurance Co., 1 Madison Ave., New York City. Free.

A 12-page mimeographed leaflet, giving notes on the history of poster making, the qualities of a good poster, and how to make posters of various types.

### Supplies

**Celluloid Picture Holders.** Gaylord Bros., 155 Gifford St., Syracuse, N. Y. Prices on application.

An excellent means of avoiding rapid wear and tear in exhibiting pictures. Various sizes.

**University Prints Notebook for Mounting Pictures.** University Prints Co., Newton, Mass. \$1.25.

This notebook provides space for mounting 200 pictures. The sheets are green-gray. Paper for notes also provided.

### Catalogs of Charts and Posters

**Biological Charts.** Catalog No. 6R. New York Biological Supply Co., 34 Union Square, New York City.

Both Geiman and American charts are sold by this company. The catalog includes many reproductions.

**Biological Charts and Pictures.** Catalog FB-28. A. J. Nystrom Co., 3333 Elston Ave., Chicago, Ill.

A catalog in which a great number of charts are reproduced in miniature, including materials in botany, zoölogy, physiology, and genetics, many of which are imported.

**Catalog of Posters.** National Child Welfare Association, 70 Fifth Ave., New York City. Free.

Shows small replicas, many on health topics. These are for younger pupils, primarily, but are useful also in high schools.

**Walter L. Lillie**, 184 South High St., Columbus, Ohio

Catalog of educational pictures, maps, and charts.

**List of Posters on Patent Medicines and Quacks.** American Medical Association, 535 North Dearborn St., Chicago, Ill. Free.

This list shows small reproductions of the posters, 22"x28" in size, which sell for 30c each, or \$5.00 for the set of 40.

**Maps, Charts, Photographs.** A list included in Miscellaneous Circular No. 103, U. S. Dept. of Agriculture, Washington, D. C. Free.

Illustrative materials from many sources and of many types are listed in this booklet.

**The Picture Collection.** Revised. Dana and Gardner. H. W. Wilson Co., 958 University Ave., New York City. \$1.50.

Discusses charging systems, wrapping pictures, filing pictures, mounting and repairing, etc. Very valuable.

**Rickets Must Go.** Mulberry Health Center, 256 Mott St., New York City. Free.

A brief catalog of posters with reproductions.

**Safety Poster Catalog.** National Safety Council, 108 E. Ohio St., Chicago, Ill., or 120 West 42nd St., New York City. Free.

This catalog gives small reproductions of available posters. Very good ones on "Poison Ivy," "Artificial Respiration," "Blood Poisoning," etc. Various sizes and prices.

**Sources of Maps, Charts, Photographs and Prints.** Division of Agricultural Instruction, Washington, D. C. Free.

A useful mimeographed list covering the fields of Agriculture, Nature Study, and Biology. Ask for similar lists for teachers, covering other subjects.

## C. GENERAL SCIENCE AND BIOLOGY

### Miscellaneous

**F. M. Baker Apparatus Co.,** Syracuse, N. Y.

Bird pictures in color—charts, maps, etc. Send for catalog of prices.

**Biological Stereoscopic Photographs.** Keystone View Co., Meadville, Pa.

These stereoscopic views bring out relationships of structure difficult to represent by ordinary photographs. Write for catalog.

**Brown's Famous Pictures.** Geo. P. Brown and Co., 38 Lovett St., Beverly, Mass. Catalog 5c.

Portraits of scientists, and pictures of birds and nature subjects, etc., are included among pictures of many types.

**Cloud Forms.** Weather Bureau, Washington, D. C. Distributed by Supt. of Documents. 5c.

Twelve half-tone plates on sheet 20"x26".

**Jenks' Prehistory Chart.** A. J. Nystrom Co., 3333 Elston Ave., Chicago, Ill. \$2.75.

Wall size, 50"x38", in colors. Correlates human cultures with geological periods. Student desk size in preparation.

**Map of Lindbergh's Flights.** The John Day Co., 23 West 45th St., New York City. \$2.05.

Lithographed on heavy paper in ten colors. 29"x49". Tracing each of the epochal flights of "We."

**Maps of National Highways.** National Highways Association, Washington, D. C. Free.

For each section of the United States.

**Old Ashmolean Postcards.** Oxford Science Series. American Branch, Oxford University Press, 114 Fifth Ave., New York City. Each set, with explanatory letterpress. 28c.

"The Dodo." 5 cards, one in color. "Great Inventors." 5 cards, one in color. "Men of Science of the Seventeenth Century." 6 cards, in monochrome. "History of Medicine." 5 cards, one in color. "History of Mathematics." 6 cards in monochrome. Other picture postcards of flowering plants, crustacea, flatfishes, etc. 5 in a set. Plants 55c a set. Others, 28c a set.

**Outdoor Good Manners.** Bulletin No. 20, American Nature Association, 1214 Sixteenth St., N.W., Washington, D. C. Free.

Reprint from "Nature Magazine," May, 1926. Suitable for bulletin board. Contains a very telling cartoon.

**Outline Drawings.** J. L. Hammett Co., 380 Jelliff Ave., Newark, N. J.

Birds, animals, flowers, butterflies, etc., drawn by L. Agassiz Fuertes. These pictures have many classroom uses. Various prices. See page 11 of catalog, "School Supplies."

**Perry Pictures.** Malden, Mass. 3c each.

Portraits of a few scientists; pictures of animals, wild and tame; bird pictures in natural colors; also flowers, fruits, insects, fishes, etc. Size, 7"x9". Very wide selection.

**Phostint Post Cards.** Detroit Publishing Co., Detroit, Mich. \$1.25, set of 40.

Among the many subjects available are included 48 nature studies and 44 American gardens and flora.

**Photographs and Lantern Slides.** American Museum of Natural History, 77th St. and Central Park West, New York City. Various prices.

Separate catalogs: Astronomy and Geology; Birds; Mammals; Vertebrate Palaeontology, etc.

**Photographs and Lantern Slides.** Mount Wilson Observatory, Pasadena, Calif.

This catalog lists views of the instruments used in astronomy; the stars, nebulae, planets, moon, etc. Actual photographs are here made available for teaching.

**Railroad Calendar.** Committee on Public Relations of the Eastern Railroads, 143 Liberty St., New York City. Free.

A calendar with a painting of many of the ancient and modern means of transportation, and statistics on the cost of operation.

**Research Design in Nature.** Art Extension Society, Westport, Conn., or 415 Madison Ave., New York City. Portfolio in buckram \$25.00. Special students' folder \$2.00.

Contains over 3,000 designs, drawn by many artists under the direction of John Gilbert Wilkins.

**Some Outstanding Achievements in Forty Centuries of Science.** In "Science Remaking the World," by Caldwell and Slosson. Doubleday, Doran and Co., Garden City, N. Y. \$1.00.

A 14"x18" chart giving a bird's-eye picture of the major discoveries arranged in parallel columns. Compares the history of science to the life of a California big tree.

**Tuck's Famous Post Cards.** William H. Dudley, Distributor. Old Fresh Pond Road, Brooklyn, N. Y. Catalog 10c.

Landscapes, marine views, flowers, gardens, etc. Various prices. Write for catalog.

### Portraits of Scientists

**Photographs of Scientists.** Science Service, 21st and B Sts., Washington, D. C.

Some of these are post card size; others suitable for framing. Write for catalog.

**Portraits of Biologists.** A. D. Batson, Allston, Mass.

Write for price list.

**Portraits of Scientists.** Open Court Company, Chicago, Ill.

These are suitable for framing and are valuable for walls of classrooms and corridors. Send for catalog.

**Scientific Worthies.** Macmillan Co., 60 Fifth Ave., New York City. \$2.00 each.

Steel and photogravure portraits suitable for framing. Include scientists in all fields.

**The History of Mathematics.** Bureau of Publications, Teachers College, Columbia University, New York City. 50c.

Reproduction on separate sheets, suitable for framing, of three large mural paintings by M. Caro-Delvaile. These paintings show most of the outstanding figures in mathematics, many of whom are also noted in other fields of science.

### The Living World

#### ANATOMY

**Anatomical Plates of the Human Body.** Rand, McNally and Co., Chicago, Ill.

Useful in any hygiene or biology laboratory. Send for price list.



**The Bones of the Foot.** Card No. 1. The Selby Shoe Co., Portsmouth, Ohio. Free.

Card, 9"x11". Each bone numbered but not labelled. Very useful in both anatomy and hygiene classes.

**The Human Factory.** Omin Co., 141 Sixth St., Long Island City, N. Y. Large colored chart \$2.00. Small replicas free in quantities.

Highly figurative representation of the physiological processes, compared to common machinery. A similar chart may be obtained from A. G. Seiler, 1224 Amsterdam Ave., New York City. \$1.00.

**Leukart's Zoölogical Charts and Jung's Zoölogical Charts.** Kny-Scheerer Co., 10 West 25th St., New York City, or J. L. Hammett Co., 380 Jelliff Ave., Newark, N. J.

A valuable series of charts on many botanical and zoölogical subjects. Various prices; send for price lists.

#### ANIMALS

**Dog Portraits.** Clayton Remedy Co., Chicago, Ill. Free.

These animal pictures may be useful for decoration or for teaching purposes.

**Holstein Types.** Holstein-Friesian Association, Brattleboro, Vt. Free.

Charts showing representatives of the Holstein breed. School agricultural classes will find these valuable.

**Jersey Types.** American Jersey Cattle Club, 851 Sixth Ave., New York City. Free.

Charts depicting Jersey types of cattle. Useful for biology and agricultural classes.

**Wild Animals.** New York Zoölogical Society, Bronx Park, New York City. 50c each.

Large photographs. Many views of animals in captivity. A very large number to select from.

#### BIRDS

**American Song Birds.** Singer Sewing Machine Co., 149 Broadway, New York City. Free.

A set of pictures in natural colors, of birds and their eggs.

**Audubon Bird Cards.** Audubon Societies, 1974 Broadway, New York City. \$1.00 a set.

50 colored pictures, post card size, with account of habits and distribution on each card. Also "Pocket Bird Collection," set of 4, 10c each. Small charts of birds in colors, arranged according to migratory habits. Also 4 wall charts, \$2.50 each. Send for free miniature reproductions.

**Birds.** Church and Dwight, 27 Cedar St., New York City, or 1416 Willis Ave., Syracuse, N. Y. Free.

Two colored wall charts showing beautiful native birds.

**Birds of New York.** State Museum, Albany, N. Y. \$2.50 a set, in folder.

106 subjects in colors, well printed. Also "Flowers of New York"

**Bird Pictures.** Joseph H. Dodson, 920 Harrison St., Kankakee, Ill. Catalog free.

Various sizes and prices. Other materials for bird study and for attracting birds also listed in this catalog.

**Colored Plates.** National Geographic Society, Washington, D. C.

Sets on birds, wild flowers, etc. Write for prices. These are beautiful colored pictures.

**Useful Birds of America.** Church, Dwight and Co., 27 Cedar St., New York City. 10c a set.

Five sets of small colored pictures, 30 in each set. Can be had in quantities for class use. Send for list.

#### CROPS

**Chicory.** E. B. Muller and Co., Port Huron, Mich. Free.

A pictorial story of the chicory industry in the United States, with descriptions and explanations of uses.

**Cotton Field.** Johnson and Johnson, New Brunswick, N. J. 20c.

Wall chart of cotton field. Includes enlarged pictures of parts of the plant and descriptions of uses of this fiber.

**Harvesting Scenes.** J. I. Case Threshing Machine Co., Racine, Wisc. Free.

Comprise 19 views on one chart, showing grain fields and the machinery used in producing these crops.

**Pillsbury "A" Flour Mill.** Pillsbury Flour Mill Co, Minneapolis, Minn. Free.

A large cut-away view of a big flour mill, with explanations of the course of the grain until it becomes flour.

**Simplified Model Flour Mill.** Washburn Crosby Co., Minneapolis, Minn. Free.

Explains the processes and pictures the machinery used in milling flour. Also a poster, "A Kernel of Wheat," showing the regions and cellular structure of the endosperm and the embryo. An exceptionally valuable chart.

**A Wheat Grain.** Ralston Purina Co, 8th and Gratiot St., St. Louis, Mo. Free.

Large chart, in color, on the different parts of the wheat. Also smaller size for notebooks.

**The Story of Silk.** Frutchey Silk Shop, 574 Fifth Ave., New York City. Free.

A picturized map of the world on which is recorded by Hendrik Van Loon the history of silk.

#### FORESTS

**How a Tree Grows.** The American Forestry Association, 1523 L St., N.W., Washington, D. C. Free.

The parts of a tree and their functions. Also a 9"x12" poster, titled "Plant a Tree."

**How You Can Help Protect the Forests.** U. S. Forest Service, Washington, D. C. Free.

This poster is especially intended for Arbor Day. Other posters are also available.

**Industrial Value of the Forests.** National Lumber Manufacturers Association, 702 Transportation Bldg., Washington, D. C. Free.

Good views of forests, logging and lumber mills. 24"x38".

**Think and Save Our Forests.** National Fire Protection Association, 40 Central St., Boston, Mass. Free.

One of a series of educational posters, most of which are free. Write for particulars.

**Teacher's Botanical Aid.** Western Publishing House, 440 South Dearborn St., Chicago, Ill. Set \$18.50.

Consists of 30 charts containing 325 drawings of plant structures, with metal tripod stand and explanatory handbook. Write for descriptive leaflet.

**Edible and Poisonous Mushrooms.** W. A. Murrill, Bronxwood Park, New York City. \$2.00.

Shows 47 species in natural size and color, 30 of which are edible, with key of Latin and common names.

### INSECTS

**The European Corn Borer and Its Control.** Bureau of Entomology, U. S. Dept. of Agriculture, Washington, D. C. Free.

An excellent chart in colors. Many other charts available on harmful insects.

**Insecticides for Garden Pests.** Corona Chemical Co., Milwaukee, Wisc. Free.

Many insect pests and the plants they attack, shown in colors. Accompanied by booklet, "Garden Pests and Their Control."

**Principal Orders of Insects.** American Museum of Natural History, 77th St. and Central Park West, New York City. 15c.

Somewhat technical, but very useful in classes which take up classification or taxonomy.

### WILD FLOWERS

**Habitat Views of Wild Flowers.** Wild Flower Preservation Society, 3740 Oliver St., N.W., Washington, D. C.

Natural colors, post card size, 25c a doz.; outline drawings 6"x9" sheets, 75c a hundred. Write for list. Also sold by American Museum of Natural History, 77th St. and Central Park West, New York City, and by Wild Flower Society of Chicago, Miss Catherine A. Mitchell, Riverside, Ill.

**Hyde Wild Flower Charts.** The Garden Club of America, 598 Madison Ave., New York City. \$2.50 each.

Chart No. 1, Flowers You Should Not Pick; No. 2, Flowers That May Be Freely Picked. Each chart contains 25 pictures of wild flowers in natural color, with notes as to habitat, common and scientific names, etc.

**Spare the Flowers.** The Wild Flower Preservation Society, 3740 Oliver St., N.W., Washington, D. C. Paper. Free.

Emphasizes the caution that weeds will replace wild flowers destroyed by thoughtless persons. Other posters on cardboard, "Outdoor Code," etc., 2 for 5c. Also cartoons.

**Wild Flowers.** American Museum of Natural History, 77th St. and Central Park West, New York City. 25c.

Set of 12 beautifully colored cards. Postcard size. These show the wild flowers in the natural settings.

**Wild Flowers.** Advertising Dept., Coca Cola Co., Atlanta, Ga. 2c for the set.

Set of 20 small colored cards, giving common and scientific names, and description on the back of each card.

**Cross Section of Leaf.** Bureau of Publications, Teachers College, 525 West 120th St., New York City. \$1.50.

Handmade, on linen, on rod. 21"x30". A useful chart, showing the principal structures of the leaf. Not labelled.

### Foods

**Carrying Grain in Ancient Times.** Quaker Oats Co., School Health Service, 80 East Jackson St., Chicago, Ill. Free.

Chart, 26"x19". An illustration for the booklet, "Grain Through the Ages," showing a Roman galley.

**Coffee.** Cheek-Neal Coffee Co., 2nd Ave. and 40th St., Brooklyn, N. Y. Free.

Shows pictures of the coffee plant and processes in the preparation of the bean, "to the last drop."

**Food Chart.** Educational Dept., Postum Co., 250 Park Ave., New York City. Free

Very complete tables of foods, giving the tissue-building, regulatory, and energy factors in each.

**Food Portions.** Bureau of Home Economics, U. S. Dept. of Agriculture, Washington, D. C. Free.

The chart shows 100-calorie portions of 20 familiar foods in terms of ordinary household measurements.

**Food Source Maps.** Armour and Co., Chicago, Ill. Free.

Wall chart, showing food products on a map of the United States. Also "Packing House By-Products," a large sheet showing many applications of science.

**Food Value Chart.** Extension Bulletin No. 71, 1923. College of Agriculture, Cornell University, Ithaca, N. Y. Free.

Succinct tables, with good explanations.

**How to Make Good Bread.** Northwestern Yeast Co., Chicago, Ill. Free.

Every step illustrated and explained, with necessary equipment shown.

**King Corn—His Family.** Corn Products Refining Co., New York City. Free.

Chart outlining the products made from corn.

**Meat Charts.** Wilson and Co., 4100 South Ashland Ave., Chicago, Ill. Free.

Various charts, showing cuts of mutton, beef, pork, etc.

**Milk Made the Difference.** National Dairy Council, 307 North Michigan Ave., Chicago, Ill. 12c each.

Different posters—rats, dogs, pigs, chickens—showing the effect of a milk diet.

**Nutrition Flyers.** N. Y. Association for Improving the Condition of the Poor, 105 East 22nd St., New York City. 20c a set of 12.

Small sheets suitable for posting on the bulletin board, giving outlines, health rules, etc. This society also publishes larger posters and many booklets on health topics.

**Posters on Calcium, Iron, Vitamines, etc., in Foods.** The New England Dairy and Food Council, 51 Cornhill, Boston, Mass. Free.

A very good series. These posters are of different sizes and show many facts concerning diet.

**Products from All the World.** McCormick and Co., Light, Barre, and Charles Sts., Baltimore, Md. Free.

A map with numbered references to sources from which spices come. Points of interest around Baltimore are listed on the back.

**Stages in Manufacture.** Postum Cereal Co, Battle Creek, Mich. Free.

Set of 5 charts showing processes of manufacture of cereal products. A booklet of suggestions is sent with each set.

**The Story of Evaporated Milk.** Evaporated Milk Association, 231 South LaSalle Sts., Chicago, Ill. Free.

A dozen pictures, with explanations, on a wall chart, showing stages in the manufacture of this product

**The Story of Corn.** The Kellogg Co., Battle Creek, Mich. Free.

Pictures and descriptions contrasting methods of Indians and a modern factory.

**Sunkist Educational Exhibit No. 414.** California Fruit Growers Exchange, Box 530, Station C, Los Angeles, Calif. Free.

An eight-page wall chart of about three dozen views relating to growing, packing, and shipping of citrus fruits. Accompanied by booklet, "The Story of California Oranges and Lemons."

**The Vitamins.** Science News Letter No 370, page 292, May 12, 1928. 21st and B Sts., N.W., Washington, D. C. 15c a copy.

A miniature chart that might easily be copied by some pupil skilled in drawing.

**Vitamins in Foods.** Borden's Farm Products Co., 110 Hudson St., New York City. Free.

Also have "Height-Weight Tables," and other charts.

### Health

**Art in Health.** Metropolitan Life Insurance Co., New York City. Free.

Reproductions of famous paintings which reveal health, collected into a little booklet, with discussion of each.

**Denticuring.** International Dental Health Foundation, 755 Park Ave., New York City. Free.

Other charts and motion picture, "Say It with Pearls" are also available from this office.

**Detroit Tuberculosis Society**, 316 Jefferson Ave., East Detroit, Mich. 80c.

Set of 4 posters on cleanliness, sleep, posture, and germs, in 7 colors. 22"x18". (Free in Wayne Co., Mich.)

**Eye Accidents in the Industries.** National Committee for the Prevention of Blindness, 370 Seventh Ave., New York City. 50c.

Set of 4 posters.

**First Aid Chart.** Johnson and Johnson, New Brunswick, N. J. \$1.00.

Valuable instructions to be followed in case of emergency. 27"x44".

**Foot Health.** Cantilever Corp., 410 Willoughby Ave., Brooklyn, N. Y. Free.

Charts, 18"x24". Colors.

No. 1. "Muscular Structure."

No. 2. "Points of Pain Due to Flat Feet."

No. 3. "Normal Arch."

No. 4. "Effect of High Heels."

Nos. 5 and 6. "Well-fitting Shoes."

Excellent for showing anatomical structure.

**Health Charts.** American Museum of Natural History, 77th St. and Central Park West, New York City.

Charts lent to New York City schools, without charge; covering many topics.

**The House Fly.** United States Public Health Service, Washington, D. C. Free.

Chart, two colors, 16"x20". Gives picture information as to the diseases borne by the fly, and methods of exterminating this pest.

**Hygiene Charts.** The Woman's Press, 600 Lexington Ave., New York City.

Include foot health, posture, etc. Write for prices.

**Joint Committee on Health Problems in Education of the N. E. A. and A. M. A.** Address: Dr. T. D. Wood, 525 West 120th St., New York City.

Set of 58 charts on health problems in education. 22"x28". \$7.00 per set; mounted \$9.00.



**Kolynos Co.**, New Haven, Conn. \$3.00.

Set of 12 charts on oral hygiene. 22"x28". One small chart free.

**National Education Association**, 1201 16th St., N. W., Washington, D. C. 25c.

Charts—each 22"x28". Described in booklet, "Health Chart Report."

**To Keep Sickness Away.** The Gorgas Memorial Institute, 1331 G St., N. W., Washington, D. C. Free.

Two posters urging annual medical examinations.

### PICTURES, POSTERS, CHARTS

**General Science and Biology.** (Add other materials in space below.)

## D. CHEMISTRY

### General

**Anti-Stain Formulary.** Central Scientific Co., 460 East Ohio St., Chicago, Ill. Free.

A convenient little disk "finder" by which directions are given for the chemicals to use in removing various stains from different kinds of fabrics.

**Laboratory Emergency Chart.** Fisher Scientific Co., Pittsburgh, Pa. Free.

A 19"x25" chart giving directions in case of laboratory accidents, poisoning, etc.

**National Safety Council,** 168 North Michigan Ave., Chicago, Ill. Free.

Laboratory posters, 8½"x11", on accident prevention.

**The Chemical Exhibit.** The Chemical Foundation, 85 Beaver St., New York City. Free.

Booklet containing reproductions of charts, etc., from the exhibit which is now in the Smithsonian Institution, Washington, D. C.

**Melting Points of Chemical Elements.** Brown Instrument Co., Philadelphia, Pa. Free.

Arranged alphabetically, giving also a temperature scale for conversion of Fahrenheit and Centigrade.

### Aluminum

**Steps in Manufacture of "Mirro" Teakettle.** Aluminum Goods Manufacturing Co., Manitowoc, Wisc. Free.

Good material. Shows in 16 pictures the evolution of the teakettle from bauxite through the refining processes to the finished article. 16"x24".

### Calcium

**Lime Needs of Soils.** National Lime Association, Washington, D. C. Free.

A chart showing the lime needs of soils in the Eastern half of the United States. A large map of the United States is given; also another chart showing the many uses of lime in construction, agriculture, medicine, chemistry, etc. An explanatory text accompanies the two charts.

### Carbon

**How Venus Pencils Are Made.** American Lead Pencil Co., 220 Fifth Ave., New York City. Free.

Shows the process of manufacture and the countries from which graphite, clay, rubber and brass, etc., are obtained. One to each school. 21"x27".

**Products Derived from Coal.** The Barrett Co., 40 Rector St., New York City. Free.

This chart shows the many products, such as dyes, medicines, paints, etc., obtained from coal. Rather small for so much material, but valuable. 11"x16".

**Coal Products Tree.** The Koppers Construction Co., Pittsburgh, Pa. Free.

A chart showing the products obtained from coal by carbonization in the modern by-product coke oven. Printed in colors. 18"x24".

**On the Plantations of the United States Rubber Co.** United States Rubber Co., 1790 Broadway, New York City. Free.

A large chart containing numerous pictures, showing the process of gathering rubber. 24"x36".

### Copper

**Anaconda Copper Mining Co.,** 25 Broadway, New York City. Free.

Set of 10 half-tone views of Montana plant. Limited number to each school.

### Electrochemical Series

**Henry Heil Chemical Co.,** St. Louis, Mo. Free, with order of chemicals.

A long chart showing the electromotive series of metals.

### Fuels and Flames

**Quaker State Oil Refining Co.,** Oil City, Pa. Free.

A large chart showing the process of refining from the crude oil to the finished product.

**Smithsonian Institution,** Washington, D. C. (Mr. Wyer). Free.

Large charts on gas and coal problems. Will help to show the importance of these two fuels.

### Indicators

**Common Indicators.** Henry Heil Chemical Co., St. Louis, Mo. \$5.00.

A complete chart, 42"x62", printed in two colors and mounted on rollers.

### Iron

**Test Charts.** Central Alloy Steel Corp., Massillon, Ohio. Free.

These accelerated-corrosion test charts show the effect of immersing various kinds of iron and steel in acid. Size, 8½"x11".

### Metric System

**Chart on International Metric System.** Superintendent of Documents, Washington, D. C. 25c.

Every science department should have several copies. Shows relative sizes of English and metric units. 25 1"x41.2".

### Organic Chemistry

**Cream of Tartar Chart.** Royal Baking Powder Co., 100 East 42nd St., New York City. Free.

A large chart, 27"x37", mounted with wood strips at top and bottom, showing the ingredients used to produce cream of tartar baking powder.

**The Production and Care of Fine Fabrics.** Colgate & Co., P. O. Box 645, City Hall Station, New York City. Free.

Excellent pictures, in color, of the sources of cotton, wool, and linen fibers. Also, a chart of the steps in soap making.

**Alcohol "Tree."** United States Industrial Alcohol Co., 110 East 42nd St., New York City. Free.

A chart, 12"x24", tracing production of alcohol. Limited supply available.

### Periodic Tables

**Periodic Table.** Henry Heil Chemical Co., St. Louis, Mo. \$4.00.

Chart, 42"x62", on a heavy grade of white sulfite stock mounted on wooden rollers.

**Periodic Chart of the Atom.** M. W. Welch Scientific Co., 1516 Orleans St., Chicago, Ill. \$5.00

A large chart, lithographed in six colors, compiled by H. D. Hubbard of the United States Bureau of Standards.

**Periodic System.** World Book Co., Yonkers, N. Y. Free.

A small chart of the periodic system of elements.

### Precious Metals

**Chemical Stages in the Manufacture of Film.** Eastman Kodak Co., Rochester, N. Y. Free to teachers.

Photostat of actual substances in specimen bottles. Will help to make the process clear.

### Silicon

**Picturing the Manufacture of Portland Cement.** Portland Cement Association, 33 West Grand Ave., Chicago, Ill. Free.

Chart, 7"x9" in size.

### Sodium

**Alkali Tree.** Solvay Process Co., Syracuse, N. Y. Free.

A chemical chart on alkali.

**Baking Powder Production Map.** Calumet Baking Powder Co., 4100 Fillmore St., Chicago, Ill. Free.

A chart of 16 pictures showing various steps in the manufacturing processes. Two sizes: one 48"x36"; the other 12¼"x9½".

### Sulphur

**Fourdrinier Paper-Making Machine.** Hammermill Paper Co., Erie, Pa. Free.

A large picture showing the complete process of paper making. They also will send a series of pictures showing the historical background and modern methods of paper manufacture.

### Zinc

**Zinc-Oxide Tree.** American Zinc Sales Co., Columbus, Ohio. Free.

Chart, 9"x12", showing the various products obtained from two kinds of zinc ore.

**The Manifold Uses of Zinc.** The New Jersey Zinc Co., 160 Front St., New York City. Free.

A chart, 12"x38", showing the wide uses of this metal in industry and elsewhere.

## E. PHYSICS

### Electricity

#### BATTERIES

**Edison Cell Wall Chart.** Edison Storage Battery Co, Orange, N. J. Free.

A valuable chart, 14"x24", showing the construction and chemical processes involved.

**The Electric Storage Battery Co.,** Philadelphia, Pa. Free.

A large chart, 41"x82", nicely mounted with wooden strips at top and bottom, showing the parts and assembling of a typical lead storage battery, together with the chemical action of charge and discharge. A valuable chart.

#### GENERAL

**High School Photo News Service.** Lecture Bureau, General Electric Co., 1 River Road, Schenectady, N. Y. Free.

This News Service is of great value to all science teachers. A 15"x18" frame is provided and posters are issued twice each month in the school year.

#### INSTRUMENTS

**Weston Electrical Instrument Co.,** Newark, N. J. Free.

A set of three charts, 16"x18". One each on the D. C. ammeter, the A. C. ammeter, and the wattmeter. Good material.

#### TELEPHONE

**New Jersey Bell Telephone Co.,** various commercial branches; or American Telephone and Telegraph Co., 195 Broadway, New York City. Free.

Five charts showing materials from which the telephone is made. Each one 22"x28".

### Heat

#### ENGINES

**4-8-2 Type Locomotive.** The Baldwin Locomotive Works, Philadelphia, Pa. Free.

A chart showing in detail the parts of this locomotive, named and numbered.

**Charts on Transportation.** Mr. Carl Mitman, Division of Mechanical Technology, Smithsonian Institution, Washington, D. C. Free.

Excellent pictures of locomotive, automobile, and other means of transportation.

**Carburetor Charts.** Zenith-Detroit Corporation, Hart Ave., Detroit, Mich. Free.

Two excellent charts, 16"x21", showing a carburetor in cross section and the "constant-flow" device.

**Stromberg Carburetors.** Stromberg Motor Devices Co., 58 E. 25th St., Chicago, Ill. Free.

Two large charts in color, showing construction of different types of carburetors. Will also send a booklet of thirty-two pages entitled, "The Stromberg Plain Tube Carburetor," which describes construction and operation.

#### EVAPORATION

**Psychrometric Chart.** Carrier Engineering Corporation, 750 Frelinghuysen Ave., Newark, N. J. Free.

A large chart giving relative humidities by reference to a graph.

**Relative Humidity Table.** Wilder-Pike Thermometer Co., Inc., 35 Paine St., Green Island, Troy, N. Y. Free.

Relative humidity given from thermometer readings. Temperature chart is also available.

**The Story of Evaporated Milk, and What Happens in the Vacuum Pan in the Manufacturing of Evaporated Milk.** Evaporated Milk Association, 231 South LaSalle St., Chicago, Ill. Free.

The first is a chart 18"x29". Photographs and descriptions of the process used in preparing evaporated milk. The second is 24"x30". Contains drawings, illustrating evaporation and homogenization of milk.

#### GENERAL

**Smithsonian Institution.** Washington, D. C. (Mr. Wyer). Free.

Charts on gas, coal, and water-power problems Show the importance of these power sources,

### HEATING SYSTEMS

**Ruud Manufacturing Co., Pittsburgh, Pa. Free.**

Two charts, 18"x27", nicely mounted. One shows the automatic storage system, the other the automatic (instantaneous) water heater. Details of construction plainly brought out.

### REFRIGERATION

**The Refrigerating Cycle. Copeland Co., 639 Lycaete Ave., Detroit, Mich. Free.**

An excellent chart in colors, 11"x14", showing the refrigerating cycle. It is mounted on linen. One to a school.

### THERMOMETRY

**Charts from Recording Instruments. Brown Instrument Co., Philadelphia, Pa. Free.**

Charts of all kinds, taken from the various recording instruments put out by this company. Of general interest.

### WEATHER

**Weather Map. Weather Bureau Office, 17 Battery Place, New York City. Free.**

This, or the nearest weather bureau, will send a daily weather map, with the understanding that it be displayed regularly.

### Light

#### LENSES

**Bausch and Lomb Optical Co., Rochester, N. Y. Free.**

A large chart showing a general view of a microscope and the diagrammatic construction of the image formed. Also smaller size for student notebooks. Good material.

**Leitz Microscope Chart. General Biological Supply House, 761 East 69th St., Chicago, Ill. Free.**

Chart naming parts and explaining optical principles. Of decided value.

### Mechanics

#### PNEUMATICS

**Ingersoll-Rand Co., 11 Broadway, New York City. Free.**

Will send photographs of air compressors, rock drills, etc.



**Instruction Chart for Aneroid Barometer.** General Science Quarterly, Salem, Mass. 25c.

Published separately from the magazine.

#### METRIC SYSTEM

**Metric Advance Chart.** Metric Association, 156 Fifth Ave., New York City. Free.

These charts, 14 by 21½ cm., are of decided value. Show the trend toward adoption of the metric system.

**Chart on International Metric System.** Superintendent of Documents, Washington, D. C. 25c.

Every science department should have several copies. Showing the relative size of English and metric units. 25.1"x41.2".

#### Sound

**Sound Charts.** E. P. Dutton and Co., 681 Fifth Ave., New York City. Set of 9 charts, \$6.00.

Prepared primarily for phonetics, these charts are also useful in both physics and anatomy classes. They show the positions of the various vocal organs for producing the chief language sounds.

#### PICTURES, POSTERS, CHARTS

**Chemistry and Physics.** (Add other materials in space below.)

### III. LANTERN SLIDES

The use of the lantern slide undoubtedly has been very extensive in science teaching for many years. Good slides were obtainable long before the educational moving picture, or the newest equivalent of the lantern slide, the strip film, appeared.

It is not the purpose here to discuss the relative merits of the different types of visual aids. Certain it is that all add a great deal to science teaching. In the section on the motion picture, however, will be found reference to articles and books attempting to answer this question.

This section lists lantern slides, especially sets of slides and film slides (also called strip films). By the latter is meant a series of pictures corresponding to the older lantern slide set, all contained on one strip of film. These rolls are designed for projection in special small machines, or in special adaptors to be attached to regular lantern slide projectors. No attempt has been made to distinguish these two forms as, for teaching purposes, they are probably equivalent. The comment, however, will make clear which is being described. Thus, "52 frames" indicates a strip film. The word *Free* after a strip film title indicates that the roll will be given to the school for its permanent possession. The same comment after a lantern slide title means that the slides are rent free, the only cost being for transportation. Many companies, notably the General Electric Co., are putting out their free lectures in both forms. All lectures of this company are obtainable in the lantern slide form and most of them are now available in the newer form as well.

Since there are comparatively few sets of slides dealing with a single topic in Biology and General Science, no attempt has been made to classify these by subjects. Instead, sources of slides and strip film, both free and purchasable, are listed. These firms are, of course, sources of material in Chemistry and Physics also, and therefore have not been repeated under those heads.

In the Chemistry and Physics sections, lantern slides and strip films have been classified by topics. Individual slides are, of course, not listed.

### A. MAKING LANTERN SLIDES

Valuable as purchased and borrowed lantern slides may be, they are not equal, in many cases, to the slides made by students, which possess the peculiar value that homemade products always have. The artistically inclined student will take pleasure in making slides for class use and his interest in the subject will be enhanced by the activity. The subject for a lantern slide may be a particularly good diagram from a text not used by the class, or, better still, an original drawing or diagram to show the production steps of some local firm's output, or the working of some familiar machine.

The steps in the making of a lantern slide are simple. A piece of glass of the proper size is cleaned, and covered with a thin coating of gelatin solution. When the glass is dry the drawing, of a size to fit, is placed under the glass and traced with India ink on the dry, gelatinized surface. Portions of the slide may be colored at this time, if desired. A frame of paper is then placed around the drawing, a clean glass of the same size is laid over it, and the two glasses are bound together by strips of "passe partout."

Another method is to use colorless gelatine placed between the two halves of a folded piece of carbon paper, and then to draw, write, or type the slide material on the gelatine sheet. An impression must be obtained on both sides of the gelatine for the best results. Hence the use of the carbon paper.

A third possibility in lantern slide work is for the student interested in photography to make photographs on lantern slides. Glass, of the slide size, with one side sensitized for photographic work may be obtained from the Eastman Kodak Co. A complete account of the proper procedure is given with the package containing the plates, or better in the pamphlet listed below. In this way, pictures of some local industry, or of some demonstration experiment, may be obtained.

### References and Sources of Material

#### MAKING AND USING LANTERN SLIDES

**Inexpensive Lantern Slides for Text or Tabular Data.** R. A. Gortner. Science, Vol. 64, p. 162 (Aug. 15, 1924). Grand Central Terminal, New York City. 15c a copy.

**Photographing for Lantern Slides.** F. A. Waugh. Photo-Era, Vol. 51, pp. 190-93 (Oct., 1923). Out of print. Consult in library.

**Personal Practice in Slide Making.** Photo-Era, 42:80 (Feb. 1919). Out of print. Consult in library.

**Hand-Made Lantern Slides.** Science, Vol. 48, pp. 221-22 Aug. 30, 1918). Grand Central Terminal, New York City. 15c a copy.

**Illustrative Materials.** The Science Classroom, March, 1927. 250 Fourth Ave., New York City. 3c a copy.

**Lantern Slides—How to Make and Use Them.** Eastman Kodak Co., Rochester, N. Y. Free.

#### SOURCES OF MATERIAL

**Beseler Lantern Slide Co.,** 131 E. 23rd St., New York City.

- \* This company sells the gelatin mats described on page 43 for 4c each. Passe partout tape and other such materials may also be obtained here.

**The Cambridge Botanical Supply Co.,** Waverly, Mass.

The Cambosco Quickway Lantern Slides Kit that this company puts out is a collection of materials necessary for lantern slide production by the method of drawing on glass. It sells for \$6.00, and contains 100 glass plates, 50 cut-out mats or frames, and materials for drawing and coloring slides.

**Eastman Kodak Co.,** Rochester, N. Y.

Packages of this company's lantern slides for photographic work may be ordered through any local dealer or direct from the main office.

**Radio Mat Slide Co.,** 167 West 48th St., New York City.

Material on which slides may be typewritten, as described on page 43.

In general, most of the companies listed in the following divisions as carrying lantern slides for sale or rent, carry a complete line of glass for slides, passe partout, and other materials.

**B. GENERAL SCIENCE AND BIOLOGY**

**Barrett Co.**, 40 Rector Street, New York City.

Slides may be purchased or rented from this company. Send for catalog.

**Bray Screen Products, Inc.**, 130 West 46th St., New York City.

Representative titles are "Eternal Nature," 52 frames, \$1.50. No. 118L, "The Fly as a Disease Carrier." \$3.00. Film slides only.

**N. F. Davis**, Bucknell College, Lewistown, Pa.

Lantern slides on zoological subjects. Write for price list.

**Detroit Publishing Co.**, Detroit, Mich.

Slides for rent or made to order. Write for catalog.

**Geography Supply Bureau**, 314 College Ave., Ithaca, N. Y.

Slides for sale only. Send for list.

**Standard Slide Corporation**, 228 West 56th St., New York City.

Slides for sale only. Send for catalog.

**William Stieren Optical Co.**, 204 Sixth St., Pittsburgh, Pa.

Slides for rent. Write for price list.

**Taylors, Limited**, 274 Carlton St., Winnipeg, Manitoba.

Slides for sale and rent, or made from individual copy. Write for catalog.

**Transparex Educational Slide Co.**, 2241 Clifton Ave., Chicago, Ill.

Send for catalog.

**Turtox Lantern Slides**. Catalog of General Biological Supply House, 761 East 69th Place, Chicago, Ill.

Slides for sale on biological objects.

**Illinois State Food Commission**, 431 Dearborn St., Chicago, Ill. Free.

Lantern slides, with lecture.

**The Visual Method of Instruction.** International Harvester Co., 606 South Michigan Ave., Chicago, Ill. Free.

Gives lists of lecture charts, lantern slides, and motion pictures.

**Keystone View Co.,** Meadville, Pa.

Send for science catalog, No. 27.

**Louis Pasteur.** School Health Bureau, Metropolitan Life Insurance Co., 1 Madison Ave., New York City. Free.

Accompanied by an outline for teachers, explaining the pictures in some detail.

**McIntosh Lantern and Slide Service,** 30 East Randolph St., Chicago, Ill.

A series on economic subjects. Send for catalog.

**Stereopticon Slides of Wild Birds and Mammals.** National Association of Audubon Societies, 1974 Broadway, New York City. In colors, \$1.00 each.

Send for lists. Many subjects from which to choose.

**National Committee for Prevention of Blindness,** 130 East 22nd St., New York City.

Slides on the subject of blindness may be borrowed from this organization. Write for lists.

**Catalog of Lending Collections.** New Jersey State Museum, Trenton, N. J.

Lists of lantern slides, charts, photographs, exhibits, etc. Free to schools in that state.

**Biological Supply Co.,** 34 Union Square, New York City.

Send for catalog No. 64 on lantern slides, projectors, and accessories.

**Pennsylvania State Museum,** Harrisburg, Pa.

Wide selection in science, agriculture, forestry, travel. For use in that state; charges express, breakage. Send for list of lantern slides.

**Pilgrim Photoplay Exchange,** 804 South Wabash Ave., Chicago, Ill.

Few sets: Physiology, Geology, Extinct Animals, Darwinian Theory. May be purchased or rented. Write for price list.

**Picturol Library.** Society for Visual Education, 327 South LaSalle St., Chicago, Ill.

Film slides on many subjects. Write for catalog.

**Spencer Lens Co.,** Buffalo, N. Y. \$3.00 a roll.

Sets of film slides on transportation, national parks, forestry, birds, hygiene, etc., etc. Write for catalog.

**A. T. Thompson and Co.,** Boston, Mass.

Slides on zoological subjects for rent or for sale. Write for catalog.

**University of Chicago Press,** Chicago, Ill.

Slides from the Yerkes Astronomical Observatory. Send for descriptive list.

**School Slide Catalog No. 31.** Victor Animatograph Co., Davenport, Iowa. 15c.

Slides on many science topics, including portraits of scientists. Also free industrial slide service.

**Visual Text Sales Co.,** 1890 Crenshaw Blvd., Los Angeles, Calif., or 71 West 23rd St., New York City.

Write for catalog and information.

**W. M. Welch Scientific Co.,** 1516 Orleans St., Chicago, Ill.

Write for Catalog L on lantern and microscopic slides and projection apparatus.

**Teacher's Guide.** Williams, Brown, and Earle, 918 Chestnut St., Philadelphia, Pa. Free.

Lists lantern slides. Slides and other visual material on a wide variety of subjects.

**Your Mouth and Your Health.** Educational Bureau of Pyorrhea Prevention, Freeville, N. Y. Free.

Set of 14 slides, accompanied by a lecture. Write for prospectus.

**LANTERN SLIDES**

**General Science and Biology.** (Add other materials in space below.)



## C. CHEMISTRY

### Calcium

**Lime and Clay Products.** Bray Screen Products, Inc., 739 Seventh Ave., New York City. \$3.00.

No. 739 (L). 79 frames. Deals with concrete, bricks, tiles, and pottery.

**The Story of Marble.** Bray Screen Products, Inc., 729 Seventh Ave., New York City. \$3.00.

No. 734 (L). 86 frames. Quarrying the stone, and shaping, grinding, and polishing it. Its use in many buildings, including the Arlington Memorial in Washington, D. C.

### Carbon

**Coal Mining.** Bray Screen Products, Inc., 729 Seventh Ave., New York City. \$1.00.

No. 151 (C). 49 frames. Diagrams of a sub-surface mine, showing geological formation. Shows system of shafts and compares coal resources of nation to those of city of New York.

**The Origin of Coal.** Bray Screen Products, Inc., 729 Seventh Ave., New York City. \$1.00.

No. 27 (D). 57 frames. Bituminous and anthracite coal beds created from vegetation of carboniferous age. Shows geologic processes. Contains maps, showing location and principal coal beds.

**Mining Bituminous Coal.** Society for Visual Education, 327 South LaSalle St., Chicago, Ill. \$2.00.

36 frames with teaching manual. Mining, transportation, and use. Part of a Commercial Geography set of 11 rolls. \$18.00 for full set.

**The Story of Coal.** Bray Screen Products, Inc., 729 Seventh Ave., New York City. 2 parts. \$3.00 for each part.

No. 524 (L). 103 frames. Begins with change of trees to coal. Shows types of mines and mining and means of taking out coal.

No. 564 (L). Part 2. The transportation and distribution of coal, etc.; conversion into power and delivery to the home.

**Rubber.** Spencer Lens Co, Buffalo, N. Y. \$3.00.

53 frames, with manual. Shows gathering rubber, refining, and making tires.

### Copper

**The Story of Copper.** Bray Screen Products, Inc., 729 Seventh Ave., New York City. \$3.00.

No. 528 (L). 89 frames. Shows the commercial uses of copper, beginning with mining and continuing through the smelting and refining processes.

### Foods

**Inspection of Food Products.** Bray Screen Products, Inc., 729 Seventh Ave., New York City. \$3.00.

No. 712 (L). 94 frames. Government inspection and marking of foods to insure purity.

### Fuels and Flames

**Petroleum.** Spencer Lens Co., Buffalo, N. Y. \$3.00.

43 frames, with teacher's manual. Production and refining of oil.

**Petroleum and Gas.** Bray Screen Products, Inc., 729 Seventh Ave., New York City. \$3.00.

No. 737 (L). 98 frames. Drilling, transporting, and refining petroleum and its use. Also shows the manufacture of illuminating gas.

**Petroleum Refining.** Society for Visual Education, 327 South LaSalle St., Chicago, Ill. \$2.00.

25 frames, with teaching manual. Part of a Commercial Geography set of 11 rolls. \$18.00 complete.

### Iron

**The Story of Iron and Steel.** Bray Screen Products, Inc., 729 Seventh Ave., New York City. \$3.00.

No. 533. 77 frames. Mining and metallurgy of iron. Good material.

### Nitrogen Family

**Grinnell Co.** Publicity and Promotion Dept., 277 West Exchange St., Providence, R. I. Free.

A set of lantern slides showing in detail the construction of the Grinnell Sprinkler Head and how it operates.

### Organic Chemistry

**Naval Stores.** Spencer Lens Co., Buffalo, N. Y. \$3.00.

25 frames, with manual. Deals largely with producing pitch, tar, resin, and turpentine.

**Some By-Products of Meat Packing Industry.** Spencer Lens Co., Buffalo, N. Y. \$3.00.

47 frames. Shows how glycerin, tennis strings, etc., are produced. Teacher's manual provided.

### Precious Metals

**Making Camera Film.** Society for Visual Education, 327 South LaSalle St., Chicago, Ill. \$2.00.

26 frames, with teaching manual. Part of a Commercial Geography set of 11 rolls. \$18.00 complete.

### Silicon

**Concrete.** Spencer Lens Co., Buffalo, N. Y. \$3.00.

22 frames. Shows manufacture and use. Manual for teachers provided.

**Manufacture of Cement.** Society for Visual Education, 327 South LaSalle St., Chicago, Ill. \$2.00.

43 frames, with teaching manual. Manufacture, transportation, and use. Part of a Commercial Geography set of 11 rolls, costing \$18.00 in all.

**The Manufacture of Portland Cement.** Portland Cement Association, 33 West Grand Ave., Chicago, Ill. Free.

Set of 50 slides describing the complete process.

**Uses of Concrete.** Society for Visual Education, 327 South LaSalle St., Chicago, Ill. \$2.00.

50 frames, with teaching manual. Part of a Commercial Geography set of 11 rolls. \$18.00 complete.

### Sodium

**Salt.** Society for Visual Education, 327 South LaSalle St., Chicago, Ill. Free.

20 frames. Tells story from the mining of the rock salt to the boxing of the refined salt.

**The Story of Salt.** Bray Screen Products, Inc., 729 Seventh Ave., New York City. \$3.00.

No. 545 L. How rock salt is mined in deep salt beds; how table salt is obtained from salt wells and then evaporated, purified, and screened for table use.

#### Miscellaneous

**Industries.** Bray Screen Products, Inc., 130 West 46th St., New York City. 2 volumes, 20 film slides each. \$50.00 for each volume. Single films \$3.00.

A series of 40 film slides on industries of importance economically. Prepared under the direction of Orren L. Pease, Superintendent of Visual Education, Buffalo, N. Y. Although these films are designed primarily for use in geography some are valuable in chemistry.

#### Vol. I.

- No. 1. Building Stone.
- No. 3. Concrete.
- No. 9. Marble.
- No. 13. Petroleum.
- No. 15. Rubber.
- No. 17. Steel.

#### Vol. II.

- No. 1. Brick.
- No. 2. Coal-Anthracite.
- No. 3. Coal-Bituminous.
- No. 7. Glass.
- No. 8. Gold.
- No. 9. Iron.
- No. 11. Pottery.
- No. 12. Salt.
- Nos. 16, 17, and 18. Sugar.

Each film roll is of about 40 frames and is accompanied by a teaching manual.

## D. PHYSICS

### Electricity

#### GENERAL

**A Few Facts About General Electric Co.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

66 frames. The general organization of the plant, and its many ramifications.

**Electrical Engineering Developments of 1926.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

54 frames, with lecture. Electricity in many fields. Good for review.

**Electric Car Dumpers.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

14 frames, with lecture. An interesting application of electricity.

**Electric Control.** Westinghouse Electric and Manufacturing Co., Lecture and Motion Picture Division, Pittsburgh, Pa. Free.

Types and functions of modern control apparatus.

**Electricity in the Automobile.** Society for Visual Education, Inc., 327 South LaSalle St., Chicago, Ill. \$2.00.

25 frames. Describes the ignition and lighting systems completely.

**Electricity in the Coal Fields.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

51 slides. Electric locomotives and other equipment in the mines.

**Electricity in the Steel Industry.** Westinghouse Electric and Manufacturing Co., Lecture and Motion Picture Division, Pittsburgh, Pa. Free.

Description of a trip through a steel plant, emphasizing electrical equipment.

**Electricity on the Farm.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

56 slides. Many and varied uses in agriculture.

**Industrial Control Devices.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

47 slides. Electricity used as a means for control.

**Latest Development of Switchboard and Portable Instruments.**

Westinghouse Electric and Manufacturing Co., Lecture and Motion Picture Division, Pittsburgh, Pa. Free.

D.C. and A.C. instruments, their construction and operation.

**The Panama Canal and Its Electrification.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

60 slides. Of great interest as showing the applications of electricity in a big project.

**Railway Electrification.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

79 slides. Steps of progress in transportation.

**Some Developments of the Electrical Industry.** General Electric Co., Publicity Department, Schenectady, N. Y. Free.

65 slides. Covers many electrical fields.

**Steam Railroad Electrification.** Westinghouse Electric Manufacturing Co., Lecture and Motion Picture Division, Pittsburgh, Pa. Free.

Advantages of installation as compared to the older form of transportation.

**CATHODE RAY****Coolidge Cathode Ray Tube.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

15 frames with lecture. Shows construction and effects of Dr. Coolidge's famous tube. Good material.

**HEATING****Industrial Heating.** Westinghouse Electric and Manufacturing Co., Lecture and Motion Picture Division, Pittsburgh, Pa. Free.

Heating by electricity in many industries.

**INSTRUMENTS****History of the Watthour Meter.** Westinghouse Electric and Manufacturing Co. Lecture and Motion Picture Division, Pittsburgh, Pa. Free.

Origin and development of electric meters.

**Weston Electrical Instrument Co., Newark, N. J. Free.**

A series of four lectures accompanied by lantern slides or strip film. Lecture No. 1 tells the story of Dr. Weston's life and his factory. No. 2 deals with the theory and principle of permanent magnet movable coil (D.C.) type of instruments. No. 3 covers the theory and operation of movable iron types and transformers. No. 4 covers the theory and operation of dynamometer type instruments. All quite good but rather technical. May be obtained also from Central Scientific Co., 460 E. Ohio St., Chicago, Ill.

#### INSULATION

**Electrical Porcelains.** Westinghouse Electric Manufacturing Co., Lecture and Motion Picture Division, Pittsburgh, Pa. Free.

The insulation of high tension power lines by electrical porcelains of a special type.

#### MOTORS AND DYNAMOS

**A.C. Generators and Synchronous Motors.** General Electric Co., Publicity Department, Schenectady, N. Y. Free.

61 slides. Brings out difference in construction. Technical to some extent.

**Development of the Electric Locomotive.** General Electric Co., Publicity Department, Schenectady, N. Y. Free.

32 slides. Shows both development and construction.

**D.C. Generators.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

Many pictures of parts. With manual.

**Electric Locomotives.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

Two rolls. No. 1—3000-volt D.C. locomotive. 18 frames.

No. 2—Largest single unit electrical locomotive. 19 frames.

Both of general interest. With lectures

**Electric Motors Driving Textile Mill Machinery.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

Over 100 frames. Shows use of induction motors.

**Fundamental Principles and Design of the Electric Railroad Motor.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

24 frames with manual. Many fine diagrams of simple motor construction. Good for general study of motor.

**Gas-Electric Buses.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

17 frames with lectures. Shows type of bus and installation of gasoline engines to produce current to run motors which turn bus wheels.

**Generators in Sherman Island Hydro-Electric Station.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

About 80 frames—all titled on film. Good material.

**Harnessing Electricity.** Society for Visual Education, Inc., 327 South LaSalle St., Chicago, Ill. \$1.00.

41 frames. Of general interest.

**Hydro-Electric Energy.** Society for Visual Education, Inc., 327 South LaSalle St., Chicago, Ill. \$1.00.

43 frames with teaching manual. Part of a Commercial Geography set of 11 rolls. \$18.00 complete.

**Niagara Falls.** Bray Screen Products, Inc., 134 West 46th St., New York City. \$3.00.

45 frames with teaching manual. Shows development of hydro-electric power.

**Turbine-Generator Sets.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

About 70 frames, with lecture. Many pictures of parts of turbines, etc.

**R. Type K-T Polyphase Induction Motor.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

Over 100 frames, showing different sizes and construction.

#### RADIO

**A 100-Kilowatt Vacuum Tube.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

14 frames, with lecture. Describes a large broadcasting tube.

**Radio Communication on Trains.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

14 frames, with lecture. Shows method of installation and operation.



**Vacuum Tubes.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

General discussion of different tubes used. 44 slides.

#### STATIC

**Lightning Arresters.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

36 slides, showing the nature of lightning and problem of the arrester.

#### TELEPHONE AND TELEGRAPH

**How the Telephone Talks.** Bray Screen Products, Inc., 729 Seventh Ave., New York City. \$1.75.

100 frames.

**Wireless Telephony.** Bray Screen Products, Inc., 729 Seventh Ave., New York City. \$1.25.

74 frames. Good material, but rather old now.

#### TRANSFORMERS

**Automatic Substations.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

47 slides. The development and use of these transformer substations which require little manual operation.

**Construction and Care of Distribution Transformers.** Westinghouse Electric and Manufacturing Co., Lecture and Motion Picture Division, Pittsburgh, Pa. Free.

Manufacture, care, and maintenance of this type of instrument.

**Evolution of the Transformer.** Westinghouse Electric and Manufacturing Co., Lecture and Motion Picture Division, Pittsburgh, Pa. Free.

The development of the modern transformers.

**Transformers.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

35 slides. Principles on which transformers operate; construction.

#### WELDING

**Arc Welding.** Westinghouse Electric and Manufacturing Co., Lecture and Motion Picture Division, Pittsburgh, Pa. Free.

Showing history of welding and modern methods of use.

**The Art of Electric Arc Welding.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

24 slides. General information about arc welding and characteristics of arc.

**Atomic Hydrogen Welding.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

20 frames. A new type of welding.

**Electric Arc Welding in Industry.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

62 slides.

**Electric Arc Welding in Steel Structure.** General Electric Co., 1 River Road, Publicity Department, Schenectady, N. Y. Free.

26 slides. History of welding and methods of testing.

### X RAYS

**X Rays.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

55 frames. History, development, and uses in industry, medicine, etc. Very good.

### Heat

#### GENERAL

**Heat.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

28 slides dealing with cause and source of heat.

**Heat, Sound, and Light.** Society for Visual Education, Inc., 327 South LaSalle St., Chicago, Ill. \$2.00.

A few frames on heat. 41 frames in all.

### ENGINES

**Early History of Westinghouse Steam Turbines.** Westinghouse Electric and Manufacturing Co., Lecture and Motion Picture Division, Pittsburgh, Pa. Free.

Theory and history of steam turbine. Rather technical.

**Ship Propulsion.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

58 slides dealing with the history of navigation and modern methods of propulsion—the reciprocating steam engine, the turbine, and the Diesel engine.

**Steam-Turbine Generator Sets.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

42 slides dealing with development of steam turbines.

#### EVAPORATION

**Buffalo Foundry and Machine Co.,** Buffalo, N. Y. Free.

Set of lantern slides covering the manufacture of various types of dryers and evaporators.

#### HEATING SYSTEMS

**Mechanical Stokers.** Westinghouse Electric and Manufacturing Co., Lecture and Motion Picture Division, Pittsburgh, Pa. Free.

Three main types of stokers. Rather technical for high school use.

#### LIQUID AIR

**Peculiar Properties of the Air.** Bray Screen Products, Inc., 729 Seventh Ave., New York City. 75c.

How to boil water without heat; also interesting properties of liquid air.

#### REFRIGERATION

**Ice and Refrigeration.** Bray Screen Products, Inc., 729 Seventh Ave., New York City. \$3.00.

No. 736. 100 frames. The complete story of refrigeration. The harvesting and storing of natural ice. The making of artificial ice in modern plants. Refrigeration applied to iceless refrigerator, cold storage plants, etc.

**Refrigeration.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

38 slides covering history of refrigeration.

**Refrigeration and Freezing Devices.** Bray Screen Products, Inc., 130 West 46th St., New York City. \$3.00.

31 frames, with manual. This is No. 4 of Volume 1, of the Home Economics Series.

## WEATHER

**Work of the Weather Men.** Bray Screen Products, Inc., 130 West 46th St., New York City. \$3.00.

35 frames with teaching manual, showing the methods by which weather forecasts are made.

## Light

## GENERAL

**Heat, Sound, and Light.** Society for Visual Education, Inc., 327 South LaSalle St., Chicago, Ill. \$2.00.

Some good material

## ASTRONOMY

**Eclipse of the Sun.** Bray Screen Products, Inc., 729 Seventh Ave., New York City. \$1.00.

Diagrams and pictures of 1918 eclipse. 64 frames.

**Elementary Astronomy.** Society for Visual Education, Inc., 327 South LaSalle St., Chicago, Ill. \$2.00.

62 frames.

## ELECTRIC LIGHT

**History of the Incandescent Lamp.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

34 slides.

**Manufacture of the Incandescent Lamp.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

42 slides. Very good.

## LENSES

**How's Your Eyesight?** Bray Screen Products, Inc., 729 Seventh Ave., New York City. 75c.

45 frames. Structure and defects of the eye.

## LIGHTING

**Elementary Principles of Light and Lighting.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

Psychology of vision. Measurement of artificial illumination. 8 slides.

**Light and Vision.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

The physics of light and the development of modern illuminants. 22 slides.

**Lighting of Homes.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

History of lamps and description of proper lamps for use in the home. 57 slides.

**Lighting and Its Relation to the Industry.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

48 slides stressing relations between light and output. Light and safety. Best types of lamps.

**Modified Light and Its Uses.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

Particularly interesting to people studying home decoration and stage settings. 50 slides.

**Searchlights and Their Uses.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

25 slides.

**Store and Show Window Lighting.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

Psychological effects of good lighting, types of lamps, etc. 51 slides.

**Street Lighting.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

69 slides dealing with modern practice in street lighting, and appliances used.

## Mechanics

### GENERAL

**Mechanics.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

38 slides dealing with forces and machines. Good for review of mechanics.

**Practical Physics.** Spencer Lens Co., Buffalo, N. Y.

A set of 20 rolls titled as follows:		13. (2) Pressure in Liquids	45 frames.
1. The Metric System	27 frames.	14. (1) Air Pressure	48 frames.
2. Work	72 frames.	15. (2) Air Pressure	55 frames.
3. Levers—part 1	20 frames.	16. Non-Parallel Forces	45 frames.
4. Levers—part 2	55 frames.	17. Strength of Materials	57 frames.
5. Pulleys	38 frames.	18. Accelerated Motion	49 frames.
6. Inclined Plane	56 frames.	19. Inertia (including Centrifugal Force)	44 frames.
7. Screws	49 frames.	20. Energy	53 frames.
8. Friction	67 frames.		
9. Gears	58 frames.		
10. Power	41 frames.		
11. Efficiency	29 frames.		
12. (1) Pressure in Liquids	53 frames.		

Single rolls, \$3.00; set of 20, \$50.00. Pictures are results of work of two high school teachers in California. Excellent material.

**AUTOMOBILE**

**The Elements of the Automobile.** Bray Screen Products, Inc., 729 Seventh Ave., New York City. Set, \$25.00. Single rolls, \$2.50.

12 rolls describing each part of the auto completely, clearly, and in detail.

**ENGINEERING**

**Mechanics and Engineering Applications.** Society for Visual Education, Inc., 327 South LaSalle St., Chicago, Ill. \$2.00. 59 frames. Survey of mechanics fields.

**PNEUMATICS**

**The Air Pressure in Which We Live, and The Science of Weather Prediction.** Bray Screen Products, Inc., 729 Seventh Ave., New York City. \$1.25.

Both subjects on same roll. 56 and 40 frames Good material.

**Ingersoll-Rand Co., 11 Broadway, New York City. Free.**

This company will furnish a set of lantern slides describing the manufacture of their products, which are largely compressed air machines.

**Peculiar Properties of the Air. Bray Screen Products, Inc., Ave., New York City. 75c.**

40 frames. Both mechanics and heat in this roll.

#### Miscellaneous

**Mysteries of Snow. Bray Screen Products, Inc., 729 Seventh Ave., New York City. 75c.**

51 frames. Excellent pictures of snow crystals.

#### LANTERN SLIDES

**Chemistry and Physics. (Add other materials in space below.)**

#### IV. MOTION PICTURES

As has been pointed out elsewhere,<sup>1</sup> the field for motion pictures in science, as well as for lantern slides and strip film, is clearly defined. Certain it is that none of these visual aids can take the place of a well presented lecture demonstration, largely because of the personal contact and the adjustability of the teacher experiment to the needs of the class.

The general question of the superiority of a given projection method has aroused a great deal of interest. It is not our purpose to attempt to answer that question in the present discussion. Reference is made to it in Freeman's book<sup>2</sup> and the results of one or two experiments are given. The results of the two experiments listed in the report of a more recent investigation<sup>3</sup>, and of those cited by Freeman, while probably not conclusive, would seem to lend weight to the belief that for ordinary learning, the film slide or lantern slide is superior to the motion picture. For showing manufacturing and other processes, where considerable motion is involved, the motion picture is probably preferable.

In using the motion picture in science teaching, it must be borne in mind that, as an educative agency, the motion picture is comparatively new. There are relatively few pictures designed primarily for classroom use. The ideal subject for this work is short—not more than one reel, and preferably less. The short reel permits a showing, discussion, and testing on the film, all in the same day. And yet we find that many desirable subjects are presented in multiple reels. Until such time as classroom pictures are better adapted to teaching purposes, there is only one solution to the above dilemma. The teacher must be familiar with the contents of the various reels, so that portions of reels of relatively less value can be omitted. The omitted portions can be summarized, if they are of sufficient importance.

A new development in the field of educational motion pictures, which has great possibilities, is the use of pictures made

<sup>1</sup> Brown, H. Emmett, "Visual Materials in the Teaching of Physics," *The Educational Screen*, Vol. VII, pp. 96-97 (May 1928).

<sup>2</sup> Freeman, H. N., *Visual Education*, University of Chicago Press.

<sup>3</sup> Brown, H. Emmett, "Motion Picture or Film Slide," *School Science and Mathematics*, Vol. XXVIII, pp. 517-526 (1928).



by the teacher with student assistance. Much of what has been said in the introduction of another section (p. 43) as to the value of student-made lantern slides, is equally applicable to motion pictures of this type, with the added advantage that a larger number of students could be interested in carrying out some project involving the taking of motion pictures. The only objection seen in this plan is the fact that, while most motion picture films and projectors in use to-day are standard (35 mm.) type, the small machines for taking and projecting film use the narrow width (16 mm.) film. A plan such as has been outlined would necessitate the purchase of a new projector. The machines for projecting this narrow film are comparatively cheap, however, so that the obstacle is not insuperable. It is a point of some significance that, after carrying on experiments in the schools of Rochester, N. Y., and other cities, in which motion pictures were shown as part of the regular day's work, the Eastman Kodak Company is starting production on forty educational films, all on the narrow-width film.

At the present time the great bulk of educational motion pictures is on standard-width film, and probably will be for some time to come. Owing to the difficulties attendant upon the use of this film, there is a decided trend toward the 16 mm. stock for classroom pictures. However, at present, the subjects on the narrow film that are not duplicated in the standard size, are, so far as educational pictures are concerned, negligible. Then, too, it is a fact that many firms, notably the General Electric Company, release their films in both widths. Consequently, in the following classifications, in general only films which come either in the standard size alone, or in both the standard and the narrow size, are listed.

The term *Free* after the source means rent-free. In many cases it was impossible to state the exact rental price of a film. The firm supplying the subject desired, should be written directly for rates. Recently there has been a decided trend among firms to reduce their rental prices. Many films, formerly held for \$3.00 or \$5.00, can now be procured for as little as \$1.50. In all cases, whether the film is rented or secured free, the user must pay transportation in at least one direction. In almost all cases films marked *Rent* can also be purchased outright from the sources indicated.

Teachers using motion pictures for the first time, and not

aware of the qualities that a good motion picture should have, will be helped by the score card formulated by J. J. Weber (in *Motion Pictures for Instruction*, by A. P. Hollis, p. 206-207). Before ordering films, teachers will also practice economy by writing to the state university, the state agriculture college, the state department of education, or the state department of health for material. These agencies collect films from all sources and can offer them free or at better rates than private exchanges. If they do not have the desired film, use the address given after the film in the following sections.

In a number of cases the comment on a given motion picture has been taken from the *One Thousand and One*, the invaluable film list published by *Educational Screen*. See BIBLIOGRAPHY (p. 362). Such comments are indicated by quotation marks.

## A. BIBLIOGRAPHY ON MOTION PICTURE USE

### Books

**Comparative Effectiveness of Some Visual Aids in Seventh Grade Instruction.** J. J. Weber. The Educational Screen, 5 South Wabash Ave., Chicago, Ill. 1922. \$1.50. To subscribers to magazine, \$1.00.

**Fundamentals in Visual Instruction.** Wm. H. Johnson. The Educational Screen, 5 South Wabash Ave., Chicago, Ill. \$2.00. To subscribers to magazine, \$1.33.

**Motion Pictures for Instruction.** A. P. Hollis. The Century Co., 353 Fourth Ave., New York City. 1926. \$2.25.

**Motion Pictures in Education.** D. C. Ellis and Laura Thornborough. Thos. Y. Crowell Co., 393 Fourth Ave., New York City. 1923. \$2.50.

**Picture Values in Education.** J. J. Weber. The Educational Screen, 5 South Wabash Ave., Chicago, Ill. 1928. \$2.00. To subscribers to magazine, \$1.33.

**Visual Education.** Frank N. Freeman. The University of Chicago Press, 5750 Ellis Ave., Chicago, Ill. \$3.50.

### Articles in Periodicals

**Comparative Effectiveness of Four Different Methods of Instruction.** J. J. Weber. *Visual Education*. (No longer published. Consult library files.) Vol V: 101-103, 123, 1924.

**The Contribution of Slides and Films to Science Teaching.** Paul L. Miller. *The Educational Screen*, 5 South Wabash Ave., Chicago, Ill. Vol. V: 200-202, 1926. 25c a copy.

**The Development of a Visual Department in a School System.** Orren L. Pease. *The Educational Screen*, address above. Vol. V: 393-396, 1926.

**Evaluating the Educational Film.** J. J. Weber. *Moving Picture Age*. (No longer published. Consult library files.) Vol. V: 9, July, 1922. Also in *School Review*, University of Chicago, Chicago, Ill. Feb., 1924. 30c a copy.

**Motion Picture or Film Slide.** H. Emmett Brown. *School Science and Mathematics*, Mount Morris, Ill. Vol. XXVIII: 517-526, 1928. 35c a copy.

**A Suggested Methodology for the Use of Informational Motion Pictures.** J. J. Weber. *The Educational Screen*, address above. Vol. VII: 8-10, 1928.

**Types of Visual Aids Most Serviceable.** J. J. Weber. *The Educational Screen*, address above. Vol. III: 96-99, 1924.

**Visual Education in Detroit.** Bernadotte Cote. *The Educational Screen*, address above. Vol. II: 252-256, 1923.

**Visual Education in Detroit Public Schools.** A. Burton Barns. *The Educational Screen*, address above. Vol. V: 584-586, 1926.

**Visual Materials in the Teaching of Physics.** H. Emmett Brown. *The Educational Screen*, address above. Vol. VII: 96-97, 1928.

### Booklets

**Check List of Visual Instruction Publications.** The University of the State of New York, Albany, N. Y. Free.

**An Experiment in the Development of Classroom Films.** Thos. E. Finegan, Education Director of the Teaching Film Dept., Eastman Kodak Co., Rochester, N. Y. Free. Also "Eastman Classroom Films," free.

**Suggestions and Bibliography on Motion Pictures.** National Congress of Parents and Teachers, 1201 16th St., N. W., Washington, D. C. 15c.

**Use of Motion Pictures in Agricultural Extension.** Supt. of Documents, Washington, D. C. 10c.

**Visual Instruction Bulletin.** Department of Education, State of Ohio, Columbus, Ohio. Free.

Lists of distributors of educational films, etc.

### MOTION PICTURES

**Bibliography on Motion Picture Use.** (Add other materials in space below.)

**B. GENERAL SCIENCE****Feature Films, with Science Interest**

**Chang.** Paramount-Famous Players-Lasky Corp., 331 West 44th St., New York City. Rent.

A jungle picture screened in Siam, showing tigers, water buffalos, leopards, and elephants (native name giving the title); as well as the struggle of the natives against the forces of nature.

**Forty Thousand Miles with Lindbergh.** Metro-Goldwyn-Mayer, 1540 Broadway, New York City. Rent.

"A complete cinematic record of the Lone Eagle's exploits from the beginning of his career as our Ambassador of Good Will." From this and other films single photographs, called "stills," may be obtained at 10c each.

**Grass.** Special Exhibition Dept., Famous Players-Lasky Corp., Paramount Bldg., New York City. Rent.

7 reels. The struggle of a Persian nomadic tribe against Nature, following their annual migration in search of pasture for their flocks.

**The Iron Horse.** Fox Film Corp., 55th St. and Tenth Ave., New York City. Rent.

The romantic story of the first transcontinental railroad.

**The Lost World.** First National Pictures, 383 Madison Ave., New York City. Rent.

Conan Doyle's thrilling story of the discovery by a scientific expedition of living dinosaurs (*Brontosaurus*, *Triceratops*, etc.), on a hitherto inaccessible plateau in the highest Andes Mountains.

**Moana.** Paramount-Famous Players-Lasky Corp., Paramount Bldg., New York City.

A story of the South Seas. Write nearest exchange for rates, etc.

**Simba.** Frank Wilson. Motion Pictures Capital, 51 East 42nd St., New York City. Rent.

Martin Johnson's photographic record of crocodiles, giraffes, wildebeests, lions (native name giving the title), and other examples of the vanishing big game of the African veldt.

**The Story of Everest.** Captain John Noel, in care of Lewis J. Alber, 3608 Euclid Ave., Cleveland, Ohio. Rent.

Motion pictures of the famous attempt to scale Mt. Everest, the world's highest mountain peak.

### Inclusive Pictures

**Cinema of Science.** Pinkney Film Service Co., 1028 Forbes St., Pittsburgh, Pa.; Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. "Interesting collection of unusual scenes demonstrating the value of motion pictures in Science Education."

**General Science.** Neighborhood Motion Picture Service, 131 West 42nd St., New York City. Rent.

"Series of nine one-reel lessons. An introduction to the scientific method. The topics treated include biological, chemical, and physical facts of daily occurrence, disclosing the laws of matter and of energy in relation to everyday life."

**Film Lessons in Nature Study.** Neighborhood Motion Picture Service, 131 West 42nd St., New York City. Rent.

"Series of 18 one-reel lessons in: Sky and Clouds, Worlds Too Small to See, Laws of the Animal World, Our Seaside Friends and Their Country Cousins, Down at Our Pond, etc."

**The Bounty of Nature.** H. S. Brown, 806 South Wabash Ave., Chicago, Ill. Rent.

1 reel. "Scenic film of rare beauty, showing that nature gives all and withholds nothing."

**Living Natural History.** Raymond L. Ditmars, Scarsdale, N. Y. Rent.

Write for descriptive circular. The most elaborate and complete series of records of living animals now available. Each reel is complete, but forms a "Reel-Chapter" in the sequence from Reel I on "Anthropoid Apes," to Reel XLII, which is Episode D on "The Depths of the Sea." Free to New York City schools. Other schools may obtain the reels from Bell and Howell Co., Chicago, Ill.

**Chronicles of America.** Yale University Press Film Service, New Haven, Conn., or Pathé Exchange, 35 West 45th St., New York City. Rent.

A most elaborate series. Primarily history, but includes many points of science interest, such as the voyage of Columbus, the hour-glass of Peter Stuyvesant, etc. Ask for illustrated booklet.

### Our Universe

**The Earth and the Worlds Beyond.** Standard Motion Picture Service, Inc., 1906 South Vermont Ave., Los Angeles, Calif.;

177 Golden Gate Ave., San Francisco, Calif.; 130 West 46th St., New York City. Edited Pictures System, Inc., 130 West 46th St., New York City. Society for Visual Education, Inc., 327 South LaSalle St., Chicago, Ill. Rent.

1 reel. "Summary of the cycles of day and night, and of the seasons. Views of the sun, stars, and planets, taken through the largest telescope in existence."

**Heavens Above.** Herman Ross Enterprises, Inc., 729 Seventh Ave., New York City. Rent, \$2.00.

1 reel. "A scientific exposition of the movements of the earth and stars."

### The Weather

**Our Climate.** Fox Film Corp., 55th St. and Tenth Ave., New York City. Rent.

2 reels. "Shows how the earth is unevenly heated, different zones, and causes of different climates."

**Clouds.** U. S. Dept. of Agriculture, Washington, D. C. Free.

1 reel. "Important types of clouds and significance of some of them."

**The Farewell.** Educational Film Exchanges, 1501 Broadway, New York City, or nearest exchange. Rent.

1 reel. "One of the best 'Bruce Scenics,' glorious cloud movements, surf breaking on beach and rippling brook with mountain peaks towering above."

**The Science of Weather Prediction.** Bray Productions, Inc., 729 Seventh Ave., New York City. Edited Pictures System, Inc., 130 West 46th St., New York City. Rent.

1 reel. "How observer makes his prediction sheet; measures amount of rainfall and completes records for his entire district."

### Air Pressure

**The Air Pressure in Which We Live.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

½ reel. "Laboratory experiments made to demonstrate atmospheric pressure."

**The Story of the Airship.** Goodyear Tire and Rubber Co., Akron, O. Free.

1 reel. Title is self-explanatory. Interesting as showing an application of air pressure.

## Industrial Processes

**How Animated Cartoons Are Made and How Movies Move.**

Bray Productions, Inc., 729 Seventh Ave., New York City.  
Rent.

Each subject  $\frac{1}{2}$  reel in length. Titles are self-explanatory.

**Black Sunlight.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

1 reel. "The story of coal—its formation a million years ago and to-day—in animation. Actual photography of anthracite mining."

**The Burning Question.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

2 reels. "Anthracite mining, preparation, and transportation."

**The Story of Coal.** See comment under CHEMISTRY—CARBON (p. 101).**Cane Sugar Refining.** See comment under CHEMISTRY—ORGANIC CHEMISTRY (p. 111).**From the Gardens of the World to the Tables of the World.** H. J. Heinz Co., Pittsburgh, Pa. Free.

1 reel. "A few of the 57 varieties from seed to table."

**Familiar Foods from Foreign Fields.** H. S. Brown, 806 South Wabash Ave., Chicago, Ill.; Film Classic Exchange, Fredonia, N. Y.; Homestead Films, 732 South Wabash Ave., Chicago, Ill.; Pinkney Film Service Co., 1028 Forbes St., Pittsburgh, Pa.; World Films, 406 Englewood Ave., Chicago, Ill. Rent.

1 reel. "Interesting life history of everyday foods that come to us from the far ends of the earth."

**Our Daily Bread.** See comment under CHEMISTRY—FOODS (p. 104).**The Staff of Life.** See comment under CHEMISTRY—FOODS (p. 104).**Harvest of the Sea.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

1 reel. "The catching of deep sea fish in many different ways."



**How Salmon Are Caught.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

1 reel. "Showing various methods of fishing for British Columbia salmon. Canadian government film."

**Oyster Industry.** Carter Cinema Producing Corp., 551 Fifth Ave., New York City. Rent.

1 reel. "Where and how oysters are prepared for market (Chesapeake Bay)."

**She Blows.** Film Classic Exchange, Fredonia, N. Y. Rent.

1 reel "Whale hunting in the Pacific."

**Sponge Fishers.** Standard Film Service Co., 600 Film Bldg., Cleveland, O. Rent.

$\frac{1}{4}$  reel. "How sponges are obtained and marketed."

**Civilization's Fabric.** Converse and Co., 80 Worth St., New York City. Free.

2 reels. "Cotton, from field to mill; spinning and weaving."

**The Land of Cotton.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

2 reels. "A complete story of cotton with emphasis given to milling and weaving of cloth. Well done for instructional purposes."

**Laundering Fine Fabrics.** Colgate and Co., 105 Hudson St., Jersey City, N. J. Free.

2 reels. Reel 1, History of washing and soap-making; Reel 2, Microscopic views of textile fibers and methods of removing stains.

**From Cocoon to Spool.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

1 reel. "Life history of the silk worm; processes involved in manufacture of silk into thread."

**Silk Worm.** Better Service Film Co., Inc., 116 South Salina St., Syracuse, N. Y.; Church and School Film Exchange, 315 Polk Bldg., Des Moines, Ia. Rent.

1 reel. "History, life, and habits, with beautiful pictures of the various moths."

**Changing Hides into Leather.** Ford Motion Picture Laboratories, Detroit, Mich. Sale.

1 reel. "Steps in putting a raw hide through a modern tannery."

**The Story of Leather.** American Leather Producers, 1 Park Ave., New York City. Free.

1 reel. Leather from different animal sources to many uses.

### The Forests

**Building Forest Roads.** U. S. Dept. of Agriculture, Washington, D. C. Free.

1 reel. "Men and machinery at work in the National Forests."

**Forest and Everyday Things.** Edited Pictures System, Inc., 130 West 46th St., New York City. Rent.

1 reel. "Few realize how intimately forest products enter into everyday life and the existing need for maintaining a higher timber level."

**The Forest and Health.** U. S. Dept. of Agriculture, Office of Motion Pictures, Washington, D. C. Free.

1 reel. Many scenes from mountains of New England, showing activities of Boy Scouts, Camp Fire Girls, etc. Film is a contribution from Forest Service.

**Romance of Hardwoods.** University Extension Divisions. (Consult nearest center.) Free.

2 reels. "Great hardwoods of the south; felling the trees; transforming the logs into lumber and veneer."

**The Story of a Stick.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill.; Long-Bell Lumber Co., Kansas City, Mo. Free.

1 reel. "Manufacture of yellow pine from tree to finished product, told by an old man to his grandson."

**That Brush Fire.** U. S. Dept. of Agriculture, Office of Motion Pictures, Washington, D. C. Free.

½ reel. Showing how to burn brush properly and the cost of carelessness.

**What the Forest Means to You.** U. S. Dept. of Agriculture, Washington, D. C. Free.

2 reels. "Designed to set forth the dependence of mankind upon the forest and the evils that follow in the wake of total destruction of forest cover."

**Wood Wisdom.** U. S. Dept. of Agriculture, Washington, D. C. Free

1 reel "Structure of various kinds of wood; different qualities of hardwood and softwood; cell building in growing trees; development of decay through growth of fungi."

### Life on the Farm

**The Brown Mouse.** Homestead Films, 732 South Wabash Ave., Chicago, Ill. Rent.

6 reels "Herbert Quick's story on the screen, showing value of correct instruction and preparation for youth whose future is 'down on the farm.'"

**Farm Livestock.** U. S. Dept. of Agriculture, Office of Motion Pictures, Washington, D. C. Free.

Several one-reel subjects, such as, "How to Get Rid of Rats," "The Barnyard Underworld," "T. B. or not T. B.," etc. The third one mentioned gives valuable information concerning tuberculosis in animals.

**Finding His Job.** Pictorial Clubs, Inc., 35 West 45th St., New York City. Rent.

2 reels. "Love story, also a plea against vandalism and invasion of countryside by city tourists."

**The Go-Getter.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill.; Western Electric Motion Picture Bureau, 120 West 41st St., New York City. Free.

4 reels. "Human drama of regeneration of antiquated farm through installation of electrical labor-saving devices."

**Should I Buy a Tractor?** U. S. Dept. of Agriculture, Washington, D. C. Free.

1 reel. "The tractor question, pro and con, so presented as to enable the individual farmer to answer the question for himself."

**Ten Pounds to the Bushel.** The Quaker Oats Co., School Health Service, 80 East Jackson St., Chicago, Ill. Free.

A one-reel subject "depicting the growth of oats and their manufacture into rolled oats." Another picture obtainable is "Food Shot from Guns," which shows the growth of rice and its transformation into puffed grains.

**Turn on the Water.** U. S. Dept. of Agriculture, Washington, D. C. Free.

1 reel. "The danger of impure water on the farm; good and bad water supply systems, with examples of both kinds; how to install inexpensive systems."

### Outdoor Life

**A Day With John Burroughs.** Central Film Co., 729 Seventh Ave., New York City. Rent.

1 reel. "The great naturalist shows two children the wonders of nature about his home in Ulster County, N. Y. Natural color"

**In a Naturalist's Garden.** Film Classic Exchange, Fredonia, N. Y.; Pinkney Film Service Co., 1028 Forbes St., Pittsburgh, Pa. Rent.

1 reel. "John Burroughs in his garden at Riverly."

**Camping Adventures.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. "A day in the great wide open spaces."

**Hitting the High Spots.** U. S. Dept. of Agriculture, Washington, D. C. Free.

1 reel. "Tramping and camping through wonders of White Mountains."

**Summer Time in Minnesota.** Great Northern Railway, Advertising Dept., St. Paul, Minn. Free.

1 reel. "Visit to the land of 10,000 lakes and its resorts."

### Health and Hygiene

**Health and Hygiene.** Neighborhood Motion Picture Service, 131 West 42nd St., New York City. Rent.

Series of 9 one-reel lessons on: "Armies of Disease and Armies of Health"; "Disease Carriers"; "Health Habits—General Diet, Teeth, Posture and Feet, Exercise, Eyes"; "Little Brothers and Sisters."

**The Human Machine.** National Motion Picture Bureau, 25 Pemberton Square, Boston, Mass. Rent.

1 reel. "How to care for the human mechanism."

**Bending the Twig.** Church and School Film Exchange, 315 Polk Bldg., Des Moines, Iowa; Edited Pictures System, Inc., 130 West 46th St., New York City; Pinkney Film Service Co., 1028 Forbes St., Pittsburgh, Pa.; Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. "Designed to impress upon a child audience the importance of correct habits of daily living and personal hygiene"

**Drinking Health.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

2 reels. Showing the necessity of care of drinking water, especially in the summer time. Emphasizes need for sanitary drinking cups.

**General Personal Hygiene.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

1 reel. "Reel 12 of 'Science of Life' series. General standards of health for the individual."

**Posture.** Church Film Co., 1108 Boylston St., Boston, Mass.; U. S. Dept. of Labor, Children's Bureau, Washington, D. C. Free, from latter source.

2 reels. "Made for physicians, physical training instructors, etc., who wish to show children how to develop and maintain good posture. Reels may be shown separately."

**Good Teeth, Good Health.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

2 reels. "Mother takes children to zoo as an object lesson in care of the teeth. Doctor shows proper methods."

**Foot Follies.** Edited Pictures System, 71 West 23rd St., New York City. Rent.

2 reels. Especially for girls. Shows the effects of high heels, tight shoes, etc.

**Sunshine from the Sea.** E. R. Squibb and Sons, 80 Beekman St., New York City. Free.

Traces the production, uses, and importance of cod-liver oil.

**Working for Dear Life.** Metropolitan Life Insurance Co.,  
1 Madison Ave., New York City. Free.

1 reel. "Tells how to add years to your life."

**Yeast for Health.** Y. M. C. A. Motion Picture Bureau, 120  
West 41st St., New York City, or 1111 Center St., Chicago,  
Ill. Free.

2 reels. "Human interest story rendered instructive by means  
of X-ray photography of stomach and intestinal tract."

**The High Cost of Hurry.** Carter Cinema Producing Corp.,  
551 Fifth Ave., New York City; Motion Picture Co., In-  
dianapolis, Ind.; U. S. Bureau of Mines, Experiment Station,  
Pittsburgh, Pa. Free from last source at least.

1 reel. "Illustrating many of the accidents which occur in the  
home, on the street, on cars, in shops, and elsewhere."

**Diving and First Aid.** Edited Pictures System, Inc., 130 West  
46th St., New York City. Rent.

1 reel. "Elementary and advanced standard and fancy diving  
analyzed; followed by rescue of drowning person and resuscita-  
tion."

**A B C of Swimming.** Y. M. C. A. Motion Picture Bureau,  
120 West 41st St., New York City, or 1111 Center St.,  
Chicago, Ill. Free.

1 reel. "Elementary lessons in swimming instruction."

### Communicable Diseases

**A Blessing Born in the Agony of War.** Y. M. C. A. Motion  
Picture Bureau, 120 West 41st St., New York City, or  
1111 Center St., Chicago, Ill. Free.

1 reel. Development of a modern antiseptic.

**The Fly as a Disease Carrier.** Bray Productions, Inc., 729  
Seventh Ave., New York City. Rent.

1 reel. "Structure of the common house fly, his part in carry-  
ing disease, and suggestions for extermination." Reel 9 in "Science  
of Life" series.

**Getting Acquainted with Bacteria.** Society for Visual Edu-  
cation, 327 South LaSalle St., Chicago, Ill. Rent.

1 reel. "Essential facts about bacteria; three typical shapes;  
how they are grown and handled in the laboratory."

**How Plants and Animals Cause Disease.** Bray Productions, Inc., 729 Seventh Avenue, New York City. Rent.

1 reel. "Reel 5 of the 'Science of Life' series. Parasitism explained; bacteria and how they feed, multiply, and invade the tissue."

**Mad Dog.** Carlyle Ellis, 71 West 23rd St., New York City. Sale only.

$\frac{1}{2}$  reel. "Prevention and identification of rabies, done in animation."

**Malaria and the Mosquito.** Carter Cinema Producing Corp., 551 Fifth Ave., New York City. Rent.

2 reels. "Development of parasite which produces malaria in human body and body of mosquito; habits of mosquito, process of reproduction and preventive measures."

**New Ways for Old.** Metropolitan Life Insurance Co., 1 Madison Ave., New York City. Free.

1 reel. "Narrative of three periods—1863, no cure for diphtheria; 1900, antitoxin the cure; to-day, a perfect preventive, toxin-antitoxin."

**Pasteur.** H. S. Brown, 806 South Wabash Ave., Chicago, Ill.; Edited Pictures System, Inc., 130 West 46th St., New York City; Film Classic Exchange, Fredonia, N. Y.; Herman Ross Enterprises, Inc., 729 Seventh Ave., New York City; Homestead Films, 732 South Wabash Ave., Chicago, Ill.; Pinkney Film Service Co., 1028 Forbes St., Pittsburgh, Pa. Rent.

2 reels. "Authentic film record of life of this great bacteriologist and benefactor of humanity."

**The Price of Human Lives.** National Motion Picture Co., Indianapolis, Ind. Rent.

1 reel. Fake consumption cures contrasted with proper treatment for tuberculosis.

**The Rat Menace.** National Motion Pictures Co., Indianapolis, Ind. Rent.

1 reel. "Habits, how rats spread disease and damage property; how to exterminate them."

**On the Trail of the Germ.** National Motion Pictures Co., Indianapolis, Ind. Rent.

1 reel. "Showing how the source of tuberculosis is traced and presenting diagnosis and treatment of the disease."

**One Scar or Many.** Metropolitan Life Insurance Co., 1 Madison Ave., New York City. Free.

1 reel. Stressing the importance of smallpox vaccination.

**Yours for Health.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

2 reels. "The origin of sanitation, development through the ages, and meaning to mankind to-day."

**How Science Aids in Controlling Infectious Diseases.** E. R. Squibb and Sons, 80 Beekman St., New York City. Free.

Methods employed in manufacturing and standardizing biologic products—antiseptics, serums, etc.

#### MOTION PICTURES

**General Science.** (Add other materials in the space below.)



## C. BIOLOGY

### Life Histories

**How Life Begins.** Carter Cinema Producing Corp., 551 Fifth Ave., New York City; Church and School Film Exchange, 315 Polk Bldg., Des Moines, Ia.; Pilgrim Photoplay Exchange, 804 South Wabash Ave., Chicago, Ill. Rent.

4 reels. Microscopic biological study showing method by which new plants and animals come into existence. Film made by Geo. E. Stone. Reel 1: How life begins in protozoan, yeast plant, geraniums, sweet peas. Reel 2: How life begins in sea-urchin; life story of swallow-tail butterfly. Reel 3: Life story of frog. Reel 4: Life story of chick and white rat. In 2 reels from The Children's Museum, Brooklyn, N. Y. May be obtained in book form from Duffield & Co., 200 Madison Ave., New York City. Written by Harrison Cady. \$1.50.

**The Living World.** Carter Cinema Producing Corp., 551 Fifth Ave., New York City. Rent.

4 reels. Microscopic biological study. (A sequel to "How Life Begins.") Reel 1: Composition of protoplasm; difference between living and non-living matter. Reel 2: Characteristic activities of living things. Reel 3: Adaptation of protoplasm to its environment. Reel 4: Cycles of life and meaning of heredity.

**The Gift of Life.** American Social Hygiene Association, 370 Fifth Ave., New York City. Free.

This picture shows the various methods of reproduction in plants and animals from very simple forms of life up to the chick and the mammal.

**Cell Mitosis.** Carter Cinema, 551 Fifth Ave., New York City. Rent.

1 reel. Animated diagrams of the process of cell division.

**Nature's Nurseries.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

1 reel. "Parents and young of fish, spiders, alligators, humming birds, dogs, deer, sheep, and bears."

**Children of Nature.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

1 reel. "How young birds are brought up; method of escape by running, flying, swimming, etc."

**Fish and Fishing for Everybody.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

1 reel. "Fish incubation—excellent for biology classes."

**Water Babies.** H. O. Davis, 106 South Hudson St., Oklahoma City, Okla.; Pinkney Film Service, 1028 Forbes St., Pittsburgh, Pa.; Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. "Creatures that take to the water." Includes both those which leave the water when grown and permanent swimmers.

**Life Functions of Animals—The Frog.** Edited Pictures System, Inc., 130 West 46th St., New York City; Pinkney Film Service Co., 1028 Forbes St., Pittsburgh, Pa.; Spiro Film Corp., 161 Harris St., Long Island City, N. Y. Rent.

1 reel. "Life of the frog from egg to pollywog and metamorphosis to full-grown frog."

**The Life History of Frogs and Toads.** Pinkney Film Service Co., 1028 Forbes St., Pittsburgh, Pa.; Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. "Traced step by step with necessary contrasts drawn. Excellent for school use. Scientifically prepared."

**Toads.** Society for Visual Education, Inc., 327 South LaSalle St., Chicago, Ill. Rent.

1 reel. "Complete life-cycle of the common garden toad and tree toad"

**Eternal Nature.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

½ reel. "Cycle of life in growing plant, from pollenization to maturity."

**Do You Know Beans?** Edited Pictures System, Inc., 130 West 46th St., New York City. Rent.

1 reel. "Germination and growth of the bean from time of planting until plant is on road to maturity."

**Seeds and Seed Dispersal.** Church and School Film Exchange, 315 Polk Bldg., Des Moines, Ia.; Church Film Co., 1108 Boylston St., Boston, Mass.; Edited Pictures System, Inc.,

130 West 46th St., New York City; Pinkney Film Service Co., 1028 Forbes St., Pittsburgh, Pa.; Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. "One of the most remarkable subjects of the kind ever produced on how plants and flowers renew life; exceptional micro-photography; processes of flower and seed development shown in their entirety by timed camera exposures."

**Spring.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

1 reel. "How life begins in the early spring. Leaves and flowers sprouting. Campers answer call of spring."

**A Springtime Miracle.** Bray Productions, Inc., 729 Seventh Ave., New York City; Edited Pictures System, Inc., 130 West 46th St., New York City. Rent.

1 reel. "Wild flowers of the Yosemite photographed by stop motion as they are in the process of blossoming."

**Watching Flowers Grow.** Church and School Film Exchange, 315 Polk Bldg., Des Moines, Ia. Rent.

1 reel. "Development of blossoms shown by slow-motion photography."

**Where Plants Live.** Society for Visual Education, 327 South LaSalle St., Chicago, Ill. Rent.

1 reel. "Conditions which account for main plant associations." The study of plant ecology made vivid and interesting.

**The Science of Life.** Bray Productions, Inc., 729 Seventh Ave., New York City; Church Film Co., 1108 Boylston St., Boston, Mass. Rent and sell

12 one-reel subjects. "Made under the supervision of the Surgeon General U. S. Public Health Service. Covers general biology, communicable diseases, and personal hygiene. Series divided into three parts.

Part I deals with general biology

Reel 1. Protoplasm, the Beginning of Life.

Reel 2. Reproduction in Lower Forms of Life.

Reel 3. Reproduction in Higher Forms of Life.

Reel 4. Interdependence of Living Things.

Part II treats of communicable diseases.

Part III deals with personal and general hygiene."

### Structures and Functions

**From Protoplasm to Human Organism.** Carter Cinema Producing Corp., 551 Fifth Ave., New York City. Rent.

1 reel. "Microscopic study of one-celled life, life processes in the cell, leading to study of cell structure of human body."

**Life Functions of Animals, No. 1.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. "Biological study of *Amœba*. Ideal for classroom use." One of a series.

**Life Functions of Animals, No. 2.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. "Biological study of the *Hydra*." Second in a series. Connects protozoa and the higher animals.

**Hydra.** Edited Pictures System, Inc., 130 West 46th St., New York City. Rent.

1 reel. "Comprehensive study of the structure and life functions of this fresh-water polyp."

**Life Functions of Animals—The Grasshopper.** Spiro Film Corp., Long Island City, N. Y. Rent.

1 reel. "Biological study of the grasshopper." One of a series comparing various types of animal life.

**The Human Body.** Bray Productions, Inc., 729 Seventh Ave., New York City; Edited Pictures System, Inc., 130 West 46th St., New York City. Rent.

5 reels. "Dealing with the development, structure, function, and hygiene of the human body. Blood Vessels and Their Functions; Digestive Tract; The Heart, and How It Works; Human Development; Respiratory and Urinary Systems."

**Blood Circulation.** H. O. Davis, 106 South Hudson St., Oklahoma City, Okla.; Edited Pictures System, Inc., 130 West 46th St., New York City. Rent.

1 reel. "Microscopic study of embryo of egg and beating of turtle's heart."

**How We Breathe.** Bray Productions, Inc., Dept. of Education and Public Service, 729 Seventh Ave., New York City; Edited Pictures System, Inc., 130 West 46th St., New York City; Pilgrim Photoplay Exchange, 804 South Wabash Ave., Chicago, Ill. Rent.

½ reel. "Lungs and how they function in purifying blood; animation."

**The Point of View.** Better Service Film Co., Inc., 116 South Salina St., Syracuse, N. Y. Rent.

1 reel. "Brief sketch of the human eye; defects of sight and corrections illustrated by animated cartoons and diagrams."

**How the Fires of the Body Are Fed.** Pathé Exchange, 35 West 45th St., New York City. Rent.

1 reel. A motion picture study of the mechanical processes of digestion, including X-ray photographs of the stomach. Compares the stoking of a ship with the feeding of that most intricate machine, the human body.

**Inside Out.** Picture Service Corp., 71 West 23rd St., New York City; 217 West Illinois St., Chicago, Ill.; Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

1 reel. "Story of digestion done in animated diagrams." Helps to clear up ideas often difficult to understand.

**Studies in Animal Motion.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

1 reel. "Motions of kangaroo, frog, deer, lamb, gull, sea lions, and others; slow-motion photography."

**Hands vs. Feet.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

1 reel. "Comparison of use of hands and feet by man and animals; monkey, lion, bear, kangaroo, sea lion and others."

**Our Bone Relations.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

½ reel. "Similarity between bony structure in man and in some animals."

### Special Adaptations

**Adaptation.** Better Service Film Co., Inc., 116 South Salina St., Syracuse, N. Y. Rent.

1 reel. "Of various life forms to their surroundings."

**Carnivorous Plants.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

¼ reel. "How insect-eating plants obtain their prey. The way pitcher-plants, sundew, etc., obtain proteins."

**Plant Life and Habits.** Standard Motion Picture Service, Inc., 1906 South Vermont Ave., Los Angeles, Calif.; 177 Golden Gate Ave., San Francisco, Calif. Rent.

1 reel. "Germination of seeds; plants with animal intelligence such as the Venus fly trap and mimosa."

**Dexterity and Mimicry of Insects.** Pinkney Film Service Co., 1028 Forbes St., Pittsburgh, Pa.; Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. "Study of flies and other insects." The remarkable ability of these creatures in outwitting their foes is shown.

**Insects That Mimic.** Church and School Film Exchange, 315 Polk Bldg., Des Moines, Ia. Rent.

1 reel. "Giant weevil, cone-headed locust, walking-stick, and walking-leaf."

**Wild Creatures That Mimic.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

½ reel. "Close-up studies of leaf-winged insect, Malayan walking-leaf, Sumatran stick insect, and American walking-stick, showing how they mimic plants on which they live, how they locomote and feed."

**Nature's Armour.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

1 reel. "How animals are protected by heavy skins—elephants, hippopotamus, rhinoceros, and crocodile."

### Microscopic Life.

**Effects of Temperature on Micro-Organisms.** Frigidaire Corp., Sales Educational Division, Dayton, Ohio. Free.

250 ft. 16 mm. Pictures of paramoecia at various temperatures, demonstrating its effect on their movements and other life-processes.

**In a Drop of Water.** Educational Film Exchanges, 1501 Broadway, New York City, or nearest exchange. Rent.

1 reel. "Examples of life in deep and shallow pond waters. 'Secrets of Life' series by Tolhurst."

**Little Under-Water Workers.** National Motion Pictures Co., Indianapolis, Ind. Rent.

1 reel. "A realistic film revealing microscopic pond life." Shows tiny plants and animals of many different kinds.

**Microscopic Pond Life.** George Kleine, 49 West 45th St., New York City. Sale.

A short subject showing the myriad life in a wayside puddle.

**Studies in Micro-Biology.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. "Highly absorbing phases of life invisible to the naked eye."

**Seeing the Unseen.** Coöperative Film Exchange, 284 Turk St., San Francisco, Calif.; 1912 South Vermont Ave., Los Angeles, Calif.; Film Classic Exchange, Fredonia, N. Y. Rent.

1 reel. "Study of minute organisms by means of greatly enlarged models. Photographed under direction of American Museum of Natural History."

**An Unseen World.** Standard Motion Picture Service, 1906 South Vermont Ave., Los Angeles, Calif.; 177 Golden Gate Ave., San Francisco, Calif.; 130 W. 46th St., New York City. Rent.

1 reel. "Microscopic life found in water; cell-division, method of feeding, and navigation."

**Monstrosities of Pondland.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. "Unusual study of insect breeding and development in a pond." Shows how different the larval stages are from the adults.

**Pond and Stream Life.** Society for Visual Education, Inc., 327 South LaSalle St., Chicago, Ill. Rent.

2 reels. "Close range study of dragon-fly and pond snail." When greatly enlarged, these creatures look like veritable ogres.

### Insects

**Insects That Sing.** Church and School Film Exchange, 315 Polk Bldg., Des Moines, Ia. Rent.

1 reel. "The field cricket, dwarf field cricket, house cricket, katydid."

**Marvels of the Insect World.** Church and School Film Exchange, 315 Polk Bldg., Des Moines, Ia. Rent.

1 reel. "Hercules beetle, rhinoceros beetle, Trinidad roach, and scorpion."

**Buzz.** First Division Distributors, 729 Seventh Ave., New York City; Pinkney Film Service Co., 1028 Forbes St., Pittsburgh, Pa. Rent.

1 reel. "A microscopic study of the mosquito by Louis Tolhurst." Carefully planned and interestingly screened

**Singing and Stinging.** Pictorial Clubs, Inc., 35 West 45th St., New York City. Rent.

1 reel. "Fine microscopic presentation of life of mosquito and its destruction."

**The Ant.** Educational Film Exchanges, 1501 Broadway, New York City. Rent.

1 reel. "Underground passages below the ant hill; the physical structure of the ants themselves and life-history of the tiny animal."

**Ants, Nature's Craftsmen.** Pathé Exchange, Inc., 35 West 45th St., New York City, or nearest exchange. Rent.

1 reel. "Life cycle: structure of ant dwellings and remarkable compartments in which the ant workers care for the young as they are hatching."

**Giants of Industry.** Pinkney Film Service Co., 1028 Forbes St., Pittsburgh, Pa.; Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. "Study of fly and ant life." Shows the relatively great strength of these small creatures.

**The Ant Lion.** Educational Film Exchanges, 1501 Broadway, New York City. Rent.

1 reel. "Life history of the 'Doodle Bug' given in an interesting manner."

**The Honey Bee.** Church Film Co., 1108 Boylston St., Boston, Mass.; Edited Pictures System, Inc., 130 West 46th St., New York City. Rent.

1 reel. "Scientific method of handling bees; close-up of queen, drones, and worker bees."

**Honey Makers.** Pathé Exchange, Inc., 35 West 45th St., New York City. Write nearest exchange. Rent.

1 reel. "Life story of bees and their work entertainingly told. Remarkable closeups and unusual views of the workers at their various tasks."



**Eccentricities of the Wasp and Bee.** Pinkney Film Service Co., 1028 Forbes St., Pittsburgh, Pa.; Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. "Their habitations and modes of living."

**The Butterfly.** DeFrenes and Felton, Wilkes-Barre, Pa. Free.

1 reel. "Various stages of metamorphosis from egg to full grown butterfly."

**The Butterfly.** Educational Film Exchanges, 1501 Broadway, New York City. Write for exchanges. Rent.

1 reel. "Life history from egg to caterpillar, cocoon and butterfly. Excellent close-ups."

**Nature's Perfect Thread Spinner.** George Kleine, 49 West 45th St., New York City. Sale.

A very complete life story of the silkworm, showing its work.  
½ reel.

**The Fly.** Educational Film Exchanges, 1501 Broadway, New York City. Write nearest exchange. Rent.

1 reel. "From Tolhurst's 'Secrets of Life' series. Excellent microscopic study."

**The House Fly.** Church Film Co., 1108 Boylston St., Boston, Mass. Rent.

1 reel. "Life history, habits, manner of propagating, and method of transporting disease germs."

**Chinch Bugs.** Homestead Films, 732 South Wabash Ave., Chicago, Ill. Rent.

1 reel. "Life history and habits; methods of fighting the menace to crops."

**Corn and the Borer.** Homestead Films, 732 South Wabash Ave., Chicago, Ill; U. S. Department of Agriculture, Washington, D. C. Free.

1 reel. "A history of European corn borer infestation in the U. S. Quarantine and inspection methods. Parasites imported to aid in control work."

**The Corn Borer and What to Do About It.** Homestead Films, 732 South Wabash Ave., Chicago, Ill.; U. S. Department of Agriculture, Washington, D. C. Free.

2 reels. "The life history of the European corn borer and methods recommended for keeping this dangerous insect under control."

**Cotton's Worst Enemy.** U. S. Department of Agriculture, Washington, D. C. Free.

1 reel. "Clean-up of infested land; sweeping of fields and burning of plants, fumigation of imported cotton."

**Dangerous Invaders.** U. S. Department of Agriculture, Washington, D. C. Free.

1 reel. "How the gypsy and brown-tailed moths gained a foothold in New England; their damage to trees; fight to control them."

**Holding the Japanese Beetle.** U. S. Department of Agriculture, Washington, D. C. Free.

1 reel. "Life history of the Japanese beetle; its introduction into New Jersey and rapid spread; means of control."

**Insect Control.** J. Alexander Leggett Co., 247 Park Ave., New York City Free.

A recent film, dealing with this most important of topics.

**Our Animal Friends and Foes.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

½ reel. "Advocates preservation of bird life as remedy for great annual loss in crops destroyed by animal and insect pests."

### Animals in Natural Haunts

**Bird Life.** Fox Film Corp., 55th St. and Tenth Ave., New York City. Rent.

1 reel. Many types of birds are shown in flight and on their nests.

**Native Birds.** Edited Pictures System, Inc., 130 West 46th St., New York City. Rent.

1 reel. "Birds of the United States." Includes nests, eggs, and young, as well as the adults.

**National Bird Refuges.** U. S. Department of Agriculture, Washington, D. C. Free.

1 reel. "Trip on government patrol boat to Federal bird refuges on islands in the Gulf of Mexico, off coast of Louisiana; brown pelicans, royal terns, laughing gulls, black skimmers, and others."

**Birds of Prey.** Pathé Exchange, Inc., 35 West 45th St., New York City. Write for nearest exchange. Rent.

1 reel. "Sparrows, hawks, condor, eagle. One of the screen studies."

**Pirates of the Air.** Church and School Film Exchange, 315 Polk Bldg., Des Moines, Ia.; Church Film Co., 1108 Boylston St., Boston, Mass.; Edited Pictures System, Inc., 130 West 46th St., New York City; Pilgrim Photoplay Exchange, 804 South Wabash Ave., Chicago, Ill. Rent.

1 reel. "Chief among the aerial hunters are owls, eagles, and vultures."

**Feathered Aviators.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y.; Church and School Film Exchange, 315 Polk Bldg., Des Moines, Ia.; Church Film Co., 1108 Boylston St., Boston, Mass. Rent.

1 reel. "The whooper-swan, the spur-winged gull of South America, the eagle, etc." Flying stunts by some of the larger birds.

**Song Birds as Citizens.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

1 reel. "Familiar song birds at close range, with suggestions for their preservation and encouragement in the neighborhood."

**An Intimate Study of Birds.** Pathé Exchange, 35 West 45th St., New York City. Rent.

1 reel. Habits of black tern, ibis, grebe, black-necked stilt, mudhen, etc.

**Water Birds of the Gulf States.** Standard Motion Picture Service, Inc., 1906 South Vermont Ave., Los Angeles, Calif.; 177 Golden Gate Ave., San Francisco, Calif.; 130 W. 46th St., New York City. Rent.

1 reel. "Filmed off the Florida Keys. Terns, gulls, pelicans; splendid study of the heron."

**Nature's Rogues.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

½ reel. "Habits and life of skunks and weasels." Animals which may not fully deserve their bad reputation.

**Our Animal Engineer.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

½ reel. "The beaver at work—cutting and transporting logs, building house and dam."

**The Beaver.** Edited Pictures System, Inc., 130 West 46th St., New York City. Rent.

1 reel. "Cutting logs, taking them to home-site, building house of brush and mud and dam to insure protection."

**When Elk Come Down.** U. S. Department of Agriculture, Washington, D. C. Free.

2 reels. "Elks in the natural forests of Montana—their protection."

**The Four Seasons.** Church Film Co., 1108 Boylston St., Boston, Mass.; Edited Pictures System, Inc., 130 West 46th St., New York City; Homestead Films, 732 South Wabash Ave., Chicago, Ill.; Pinkney Film Service Co., 1028 Forbes St., Pittsburgh, Pa.; Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

4 reels. "One of the most remarkable nature study pictures ever filmed. Response of animal life to different environment from one season to next. Beautifully photographed, and titled with real artistry." Done under the direction of Raymond Lee Ditmars.

**Where the Moose Run Loose.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

1 reel. "Extraordinary pictures of moose, both on land and in water."

**Monarchs of the Plain.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City; 1111 Center St., Chicago, Ill. Free.

1 reel. "The buffalo, yak, elk, and other wild animals." The lives of these animals show adaptation to a particular type of environment.

**The Gorilla Hunt.** Film Booking Offices of America, 723 Seventh Ave., New York City. Write for nearest exchange. Rent.

Several reels. A most unusual picture. Many scenes of animal life in the jungles of Africa.

**Jungle Adventures.** H. S. Brown, 806 South Wabash Ave., Chicago, Ill. Rent.

5 reels. "Martin Johnson's jungle adventures. A fascinating chronicle." Also obtainable from Iowa State College, Agricultural Extension Department, Ames, Ia.

**Treeing and Roping Wild Animals.** Pilgrim Photoplay Exchange, 804 South Wabash Ave., Chicago, Ill. Rent.

1 reel. Title is self-explanatory.

#### At the Zoo

**American Bears.** Standard Film Service Co., 600 Film Bldg., Cleveland, O. Rent.

1 reel. "Various bears of the North American continent, photographed by Raymond Ditmars."

**Animal Appetites.** Church and School Film Exchange, 315 Polk Bldg., Des Moines, Ia.; Church Film Co., 1108 Boylston St., Boston, Mass.; Edited Pictures System, Inc., 130 West 46th St., New York City. Rent.

1 reel. "Showing what some of the boarders at the zoo prefer in the way of food."

**Animals of the Far North.** Edited Pictures System, Inc., 130 West 46th St., New York City. Rent.

1 reel. "Here is shown an excellent group of animals from polar regions."

**Babies in the Zoo.** Standard Motion Picture Service, Inc., 1906 South Vermont Ave., Los Angeles, Calif.; 177 Golden Gate Ave., San Francisco, Calif.; 130 W. 46th St., New York City. Rent.

1 reel. "Wide range of animals covered." The young of other animals are always interesting to children.

**Pigmy Circus.** Standard Film Service Co., 600 Film Bldg., Cleveland, Ohio. Rent.

1 reel. "Turtle, lizard, chameleon, Ceylonese walking leaf, tree toad, mice."

**Rare Animals.** Church Film Co., 1108 Boylston St., Boston, Mass. Rent.

1 reel. "The flying opossum, the koala, the panda, the Australian monitor, etc."

**Nearest to Man.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

½ reel. "Studies of gorilla, chimpanzee, and orang-outang." Whether we like it or not they are like us in many ways.

**Some Cold-Blooded Mexicans.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

½ reel. "Close-ups of Mexican lizards, horned toads, desert tortoises, and other curious creatures."

**Some Monsters of the Farm.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

½ reel. "Microscopic studies in motion of gorgeous eyes of frog, grasshopper, spider, and katydid."

**Turtles and Tortoises of All Lands.** Standard Motion Picture Service, 1906 South Vermont Ave., Los Angeles, Calif.; 177 Golden Gate Ave., San Francisco, Calif.; 130 W. 46th St., New York City. Rent.

1 reel. "An intimate study by Raymond Ditmars of this strange family of animals."

**Uncommon Guests.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. "Rare animals in New York Zoo." The ant-eater, the aard-vark, the giraffe, and other queer creatures.

**With Our Fur Bearing Animals.** Standard Motion Picture Service, Inc., 1906 South Vermont Ave., Los Angeles, Calif.; 177 Golden Gate Ave., San Francisco, Calif.; 130 W. 46th St., New York City. Rent.

1 reel. "Fox-farming, seal industry, smaller animals, including the raccoon, skunk, and others."

### At the Aquarium

**The Crab Family.** Standard Motion Picture Service, Inc., 1906 South Vermont Ave., Los Angeles, Calif.; 177 Golden Gate Ave., San Francisco, Calif.; 130 W. 46th St., New York City. Rent.

1 reel. "Interesting facts about the hermit spider, fiddler crab, and other members of that family."

**paths of the Sea.** Standard Film Service Co., 600 Film Bldg., Cleveland, Ohio. Rent.

4 reels. Each reel can be used singly. "Undersea life, monsters and midgets of the deep."

**vellers of the Deep.** Church and School Film Exchange, 115 Polk Bldg., Des Moines, Ia.; Edited Pictures System, Inc., 130 West 46th St., New York City; Pilgrim Photoplay Exchange, 804 South Wabash Ave., Chicago, Ill. Rent.

1 reel. "The New York Aquarium offers most interesting sights." Fishes, turtles, starfish, marine birds, etc., are included.

**thoms Deep.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

1 reel. "Miracle and tragedy of sea life are shown; shows cutopus, conger eel, sea-anemone, starfish, rosy feather, pipefish, jurnaid, and other forms of undersea life."

**Joy Rider of the Ocean.** George Kleine, 49 West 45th St., New York City. Sale.

This short subject gives the life habits of the fish that has a sucking disc on the top of its head, by which it clings to larger fishes for hitches"—it is known as Remora or the shark-sucker.

**ales and Tails.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

1 reel. Scenes at New York Aquarium.

### At the Museum

**Modern Miracle Worker.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

1 reel. "Only half devoted to title above, showing an artist of the American Museum of Natural History working on an artificial magnolia group. Other half of reel shows stages in preparation of group of caribou at Brooklyn Museum of Arts and Sciences."

### Pets and Domestic Animals

**culiar Pets.** H. O. Davis, 106 South Hudson St., Oklahoma City, Okla. Rent.

1 reel. "Strange associates of man"

**A Visit to a Birdshop.** Pinkney Film Service Co., 1028 Forbes St., Pittsburgh, Pa.; Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. "Assortment of animal life found there; of particular interest for specimens in aquarium section. Micro-photography excellent and most carefully done."

**Our Farmyard Friends.** Edited Pictures System, Inc., 130 West 46th St., New York City. Rent.

1 reel. "Domestic animals of the farm are portrayed as probably most interesting phase of farm life."

**Our Four-Footed Helpers.** Pathé Exchange, Inc., 35 West 45th St., New York City. Write for nearest exchange. Rent.

1 reel. "One of the 'Screen-Studies.' Description of ruminants on which man chiefly depends for food and clothing."

**Better Milk.** Church and School Film Exchange, 315 Polk Bldg., Des Moines, Ia.; Edited Pictures System, Inc., 130 West 46th St., New York City; Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. "Shows vast strides made in recent years by progressive farmers in the production of pure milk."

**The Horse.** Standard Motion Picture Service, Inc., 1906 South Vermont Ave., Los Angeles, Calif.; 177 Golden Gate Ave., San Francisco, Calif.; 130 West 46th St., New York City. Rent.

1 reel. "Some of his ancestors; Indian and his pony; wild horses of the plains; development of some of the best breeds of to-day."

**The Horse and Man.** U. S. Department of Agriculture, Washington, D. C. Free.

1 reel. "Shows horse's part in conquest of the New World and in modern American life. Various kinds of horses."

### Evolution

**The Cosmic Drama.** Pinkney Film Service Co., 1028 Forbes St., Pittsburgh, Pa.; Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

3 reels. "Reading the earth's history by means of erosion and fossils—origin of the solar system, appearance of life, effects of glacial action, adaptation as a function of life, types of mankind. An instructive picture."



**Evolution of the Solar System.** Edited Pictures System, Inc., 130 West 46th St., New York City. Rent.

1 reel. "The beginning of everything—the evolution of a solar system from nebula"

**Evolution.** Red Seal Pictures Corp., 729 Seventh Ave., New York City. Rent.

5 reels. "A pictured exposition of the Darwinian theory of the origin of species."

**The Animal World.** Standard Film Service Co., 600 Film Bldg., Cleveland, Ohio. Rent.

4 reels. May be used separately. Reel 1: Prehistoric Animals; Reel 2: Large Animals of Sea and Jungle; Reel 3: Birds; Reel 4: Mountain Animals and Those of Cold Regions.

**Our First Flyers.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

½ reel. "Evolution of feathered creatures of to-day from pterodactyl of prehistoric times."

**Romance of Life.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

1 reel. "Motion pictures and animation of the origin of life on earth according to accepted scientific theory."

**Was Darwin Right?** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. "Varied types of our supposed ancestors." Controversy is so often resorted to when facts offer answers to the question.

**The Struggle for Existence.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

1 reel. "Plants and animals that prey upon each other."

**Digging Up the Past.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City; 1111 Center St., Chicago, Ill. Rent.

1 reel. "Locating and obtaining skeletons of prehistoric animals in Badlands of Red Deer Valley, Canada."

**Petrified Forests.** Standard Film Service Co., 600 Film Bldg., Cleveland, Ohio; Carter Cinema Producing Corp., 551 Fifth Ave., New York City. Rent.

1 reel. "Wonders of Arizona's petrified forests and the Painted Desert in Prizma color."

**The Work of Rivers.** H. O. Davis, 106 South Hudson St., Oklahoma City, Okla.; Society for Visual Education, Inc., 327 South LaSalle St., Chicago, Ill. Rent.

1 reel. "‘Chalk talk’ illustrating the evolution of river valleys through growth, maturity, and old age."

### MOTION PICTURES

**Biology.** (Add other materials in space below.)

## D. CHEMISTRY

### General

**Chemical Inspiration.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent, probably \$3.00.

$\frac{1}{4}$  reel. "Photomicroscopy of chemicals and animated drawings produce novel effects."

### Aluminum

**Magic Gems.** Film Classic Exchange, Fredonia, N. Y. Rent

1 reel. "A study of minerals and precious stones." Pizma color.

### Atmosphere

**Explosive Dusts.** United States Department of Agriculture, Office of Motion Pictures, Washington, D. C. Free.

1 reel. Causes, results, and means of preventing dust explosions—laboratory tests and preventive devices.

**Science at Home.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. Properties of the atmosphere shown in an interesting way.

### Calcium

**Bundled Rocklath.** Rothacker Industrial Films, Inc., 7510 North Ashland Ave., Chicago, Ill. Free.

2 reels. From the mining of gypsum to the manufacture of rocklath. The use of rocklath in building construction.

**From Mine to Wall.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

2 reels. Mining, manufacture, and use of gypsum as a wall material. Good classroom material.

### Carbon and Its Compounds

**Anthracite.** General Electric Company, 1 River Road, Schenectady, N. Y. Free.

1 reel. Early coal mining and complete depiction of modern methods in mining.

**Anthracite Coal Mining.** Ford Motion Picture Laboratories, Detroit, Mich. Sale only.

1 reel. Modern methods of mining and distributing.

**Bituminous.** General Electric Company, 1 River Road, Schenectady, N. Y. Free.

1 reel. Mining and preparation of bituminous coal. Primitive and modern mining contrasted. Importance of bituminous coal to industry is shown.

**Black Sunlight.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

1 reel. The origin of coal, shown in animated drawings, and anthracite coal mining of to-day.

**The Burning Question.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

2 reels. Anthracite mining, preparation, and transportation. Good material.

**Carbon Monoxide: The Unseen Danger.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

1 reel. Shows the frequent occurrence of this deadly gas in workshops, garage, and home; and how to prevent its accumulation. Visualizes resuscitation methods for those overcome by the gas.

**Diamond Mines in South Africa.** Bray Productions, Inc., 729 Seventh Ave., New York City; Pilgrim Photoplay Exchange, 804 South Wabash Ave., Chicago, Ill. Rent.

1 reel. This film shows mining the stones and sorting and grading.

**The Doings of Turp and Tine.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill.; Hercules Powder Co., Wilmington, Del. Free.

2 reels. "Animated comedy, showing production of gum and Hercules steam-distilled wood turpentine." Good material.

**From Tree to Tire.** National Motion Picture Bureau, 25 Pemberton Square, Boston, Mass. Free.

1 reel. Shows New England highways and manufacture of tires.

**How a Dixon Lead Pencil Is Made.** J. Alexander Leggett Co., 2 West 46th St., New York City. Free.

1 or 2 reels. Complete process of manufacture from the mining of the graphite to the finished product. Good material.

**Industrious Diamonds.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

1 reel. How they are used in the manufacture of copper wire.

**Making the Rubber Tire.** Ford Motion Pictures Laboratories, Detroit, Mich. For sale only.

1 reel. From the gathering of the gum, through the various manufacturing processes to the finished product. Good material.

**The Origin of Coal.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

$\frac{1}{4}$  reel. How the forests of long ago became the coal deposits of to-day. Animated drawings.

**Pencils.** H. O. Davis, 106 South Hudson St., Oklahoma City, Okla. Probably free.

1 reel. Manufacture of pencils in modern factory.

**The Romance of Rubber.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

2 reels. Production of crude rubber on largest plantation in world. Shows America's part in this production.

**The Story of Bakelite.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill.; Bakelite Corporation, 247 Park Ave., New York City; Rothacker Industrial Films, Inc., 7510 North Ashland Ave., Chicago, Ill. Free.

2 reels. Manufacture and use of this well-known product—a carbon compound.

**The Story of Coal.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

3 reels. Reel 1 shows diamond core drill in use, sinking a shaft and a trip through a mine. Reels 2 and 3 show the complete process of mining and means for sorting, etc. Good material.

**The Story of Rubber.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

1 reel. Similar to the next title but in more condensed form.

**The Story of Rubber.** Rothacker Industrial Films, Inc., 7510 North Ashland Ave., Chicago, Ill. Free.

2 reels. The growth of rubber trees, the gathering of latex, and the production of crude rubber.

**The Story of the Tire.** Goodyear Tire and Rubber Co., Akron, O. Probably free.

1 reel. From crude rubber to finished product. Manufacture of tires in a large factory.

### Copper

**Copper Mining and Smelting.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

1 reel. On the whole the title explains the content of this film.

**Long Drawn Out.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

1 reel. A journey through a copper wire mill.

**Mining with the Llamas in Peru.** Standard Motion Picture Service, Inc., 1906 South Vermont Ave., Los Angeles, Calif., or 130 W 46th St., New York City. Rent.

1 reel. Story of vanadium and copper mining. Use of llamas as beasts of burden.

**Refining and Manufacturing Copper.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

2 reels. Title is self-explanatory.

**The Story of Copper.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

Section 1, "Mining." 5 reels. Discovery of a copper deposit; simple and modern methods for mining. Number of mines shown, including the largest copper mine in the United States. Section 2, "Milling." 2 reels. Crushing and treating ore. Flotation process

shown. Section 3, "Smelting." 1 reel. Unloading at smelter and reverberatory smelting. Section 4, "Refining." 2 reels. Electrolytic refining of copper and casting pure copper in commercial shapes. Above sections, while of too many reels to show completely, give an excellent story of the production of copper. A teacher could give part of Section 1 and such of the other sections as he wanted to stress.

**The Story of the Fabrication of Copper.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

2 reels. Supplements the ten-reel feature film, "The Story of Copper." Shows the processes by which the metal, after leaving the smelter, is made into various commercial articles.

### Foods

**Along the Milky Way.** Borden's Farm Products Co., 110 Hudson St., New York City. Free

*The story of milk and its products.*

**Behind the Breakfast Plate.** Homestead Films, 732 South Wabash Ave., Chicago, Ill.; U. S. Department of Agriculture, Office of Motion Pictures, Washington, D. C. Free.

2 reels. The story of bacon, from the pastures to the breakfast plate.

**Better Milk.** Church and School Film Exchange, 315 Polk Bldg., Des Moines, Iowa; Edited Pictures System, Inc., 130 West 46th St., New York City; Spiro Film Corp., 161 Harris St., Long Island City, N. Y. Rent.

1 reel. Shows great improvement in recent years in milk production.

**Dairy Products.** Pathé Exchange, Inc., 35 West 45th St., New York City (numerous exchanges). Rent.

1 reel. Production of milk, and manufacture and packing of cheese and butter.

**Lone Asian Traveler.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill.; Atlas Educational Film Co., 1111 South Boulevard, Oak Park, Ill.; University Extension Divisions (consult nearest center, usually at State University). Free.

1 reel. The accidental discovery of cheese and modern methods of manufacture. Excellent material.

**Making of a Star Ham.** Armour and Co., Advertising Dept., Union Stock Yards, Chicago, Ill.; Rothacker Industrial Films, Inc., 7510 North Ashland Ave., Chicago, Ill.; University Extension Divisions (consult nearest center, usually at State University). Free.

1 reel. The production of ham, showing humane methods of slaughter, sanitary packing conditions, and rigid inspection.

**Meat—From Hoof to Market.** Pathé Exchange, Inc., 35 West 45th St., New York City (numerous exchanges). Rent.

1 reel. From the cattle on the western plains to the various meat products.

**Meat Packing.** Ford Motion Picture Laboratories, Detroit, Mich. Sale only.

1 reel. The complete story of the process.

**The Meat We Eat.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent. Present price, \$1.50.

1 reel. Raising of cattle, sheep, and swine, and the meat packing industry.

**The Might of Pure Milk.** National Motion Pictures Co., Indianapolis, Ind. Rent.

1 reel. Precautions taken to insure pure milk. The food value of milk compared to other foods.

**Our Daily Bread.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. Methods of harvesting, milling, and baking from primitive to present times. Good material.

**The Staff of Life.** Church and School Film Exchange, 315 Polk Bldg., Des Moines, Ia.; H. O. Davis, 106 South Hudson St., Oklahoma City, Okla.; Edited Pictures System, Inc., 130 West 46th St., New York City; Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y.; Wholesome Films Service, 42 Melrose St., Boston, Mass. Rent.

1 reel. From the growing of wheat through the milling process. Good material.

**The Texas Trail to Your Table.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City; Rothacker Industrial Films, Inc., 7510 North Ashland Ave., Chicago, Ill.;



University Extension Divisions (see nearest center, probably at State University). Free.

1 reel. The raising of cattle, transportation to the stock yards, and preparation for the table.

**The Trump Card.** National Motion Pictures Co., Indianapolis, Ind. Rent.

1 reel. The importance of pasteurization and how it insures pure milk.

### Fuels and Flames

**Consolidated Gas Company of New York,** 130 East 15th St., New York City. Free.

"Doing It Better with Gas." "To Serve New York." "The Modern Gas Plant." "Gas Service." Each of these subjects of one-reel length show various phases of the gas industry.

**Fuel.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent. Present price, \$1.50.

1 reel. How peat, coal, and petroleum are taken from the bosom of the earth.

**Liquid Gold of Texas.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent. Present price, \$1.50.

1 reel. Story of oil production and refining. Good classroom material.

**Modern Oil Refining.** Ford Motion Picture Laboratories, Detroit, Mich. For sale only.

1 reel. Modern chemistry in the petroleum industry.

**The Story of Gasoline.** Rothacker Industrial Films, Inc., 7510 North Ashland Ave., Chicago, Ill.; United States Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

3 reels. Reel 1 shows scope of industry and distilling of gasoline from crude oil. Reel 2 shows final distillation and "cracking" process. Reel 3 shows recovery of gasoline from natural gas and delivery of finished product to retailers.

**The Story of a Mexican Oil Gusher.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

2 reels. Interesting story of the "bringing in" of a new well, capable of producing 150,000 barrels daily.

**The Story of Natural Gas.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

4 reels. Reels 1 and 2 show locating, developing, and final completion of new well and producing equipment. Reels 3 and 4 deal with distribution of gas. Latter reel shows city distribution in animated diagram. Good material.

**The Story of Oil.** H. O. Davis, 106 South Hudson St., Oklahoma City, Okla. Probably rent.

1 reel. Oil drilling and transportation.

**The Story of Penn-O-Lene.** Stark and Edwards, 329 Charles St., Baltimore, Md. Free.

2 reels. How Pennsylvania oil is produced and prepared for export.

**The Story of Petroleum.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

7 reels. Reels 1 to 3 inclusive show the locating and drilling of wells, erection of derrick, etc. Later reels show gathering process and refining. Either section might be shown independent of others.

**Through Oil Lands of Europe and Africa.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

No. 1. 2 reels. Shows oil supply of Germany, France, Spain, Morocco, and Algeria. No. 2. 3 reels. Shows oil lands of Italy, Hungary, the Danube, and Rumania. No. 3. 4 reels. As above, for Poland, Greece, and Egypt. All these subjects have very interesting pictorial and scenic values. Much of the home life of the various peoples is included. Any one of this series would be good to bring home to a group of students the great part oil plays in the economic life of the world.

**The World's Struggle for Oil.** Pathé Exchange, Inc., 35 West 45th St., New York City. Rent.

5 reels. Story of oil from Bible times to the present portrayed in vivid fashion.

### Hydrogen

**Beyond the Microscope.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. Decomposition of water into its two gases and how the gases act. Also shows how the molecules act during the process. Very good material.

### Iron

**Arteries of Industry.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

4 reels. "Manufacture of wrought steel pipe from mining ore to shipment of finished product."

**Blue Center.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

2 reels. Wire rope manufacturing.

**Fifteen Minutes with Armco Ingot Iron in Household Industry.** American Rolling Mill Co., Middletown, Ohio. Free.

1 reel. Practical application of sheet iron and steel in the home.

**Hot Rolled Products.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

1 reel. Various articles, such as rails and structural steel, produced by the rolling process.

**Iron and Steel.** Cosmopolitan Film Exchange, 2014 Third Ave., Seattle, Wash., or 449 Glisan St., Portland, Ore.; Church Film Co., 1108 Boylston St., Boston, Mass.; Ford Motion Picture Laboratories, Detroit, Mich.; Wholesome Films Service, Inc., 42 Melrose St., Boston, Mass. Rent.

1 reel. Traces the progress of iron and steel from mine to finished product. Very good material.

**Making of American Wire Rope and Its Use.** American Steel and Wire Co., 208 South LaSalle St., Chicago, Ill. Free.

4 reels. Title is self-explanatory.

**The Making of Steel.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City; 1111 Center St., Chicago, Ill.; International Harvester Co. of America, 606 South Michigan Ave., Chicago, Ill. Free.

2 reels. From ore to steel in various forms. Shows process of steel manufacture in clear fashion.

**The Manufacturing of Armco Ingot Iron.** American Rolling Mill Co., Middletown, Ohio. Free.

2 or 4 reels. Complete manufacturing process to produce iron and steel sheets.

**The Manufacture of Wire Products.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

1 reel. Drawing of wire and manufacture of products—nails, etc.

**Rolling Steel by Electricity.** Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa.; First National Bank Building, San Francisco, Calif. Free.

1 reel. Title is self-explanatory.

**Steel—From Ore to Rail.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Present price \$1.50. Rent.

1 reel. Shows the process of steel manufacture completely—from ore to cast iron, and from iron to steel, which in turn is rolled into various sizes of rails.

**Story of Alloy Steel.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill.; U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

4 reels. Complete story of manufacture of alloy steel.

**Story of Heat Treatment of Steel.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

2 reels. The process named applied to steel used in automobiles; various tests made on the finished steel. Very interesting material.

**The Story of Ingot Iron.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

3 reels. The complete story of pig iron, from ore to shipment.

**The Story of Iron.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

1 reel. Shows every step taken in producing this metal.

**The Story of Steel.** American Steel and Wire Co., 208 South LaSalle St., Chicago, Ill. Free.

4 reels. From mining of ore to various finished products.

**The Story of Steel.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa.; United States Steel Corporation, Branch of Safety, Sanitation and Welfare, 71 Broadway, New York City. Free.

6 reels. Reel 1 shows mining and transportation of ore. Reel 2 shows the operation of a blast furnace and Bessemer and open-hearth furnaces. Reels 3 to 6 show manufacture of all kinds of products from iron to steel. Excellent material.

**The Story of Steel.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

2 reels. Various basic processes for the manufacture of steel.

**Story of Writing.** National Motion Picture Bureau, 25 Pemberton Square, Boston, Mass. Probably free.

1 reel. Gives the history of various ways to record thought and shows how ink is manufactured.

**World's Records.** Carter's Ink Co., Cambridge 41, Boston, Mass. Free.

1 and 2 reel films. "The story your ink bottle tells." Manufacture of Carter's ink and adhesives.

### Nitrogen Family

**Dynamite, A Basic Material of Modern Civilization.** E. I. duPont de Nemours & Co., Inc., Wilmington, Del. Free.

6 reels. Enlarged version of "Story of Dynamite." Shows processes of manufacture and various methods of use.

**The Explosive Engineer—Forerunner of Progress.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill.; Hercules Powder Co., Wilmington, Del.; United States Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

2 reels. Explosives as used in industry to-day.

**Testing of Smokeless Powder.** Hercules Powder Co., Room 1221 Delaware Trust Bldg., Wilmington, Del. Free.

This and the other one-reel subjects: "Safety and Efficiency in the Use of Explosives in Open Pit Iron Mining," and "Modern Quarry Blasting," deal with the use and testing of different types of explosives. In either 16 mm. or 35 mm. widths.

**Story of Dynamite.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill.; E. I. duPont de Nemours Co., Wilmington, Del.; United States Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

2 reels. Reel 1 shows gathering of raw materials and details of manufacture. Reel 2 shows testing laboratories of a dynamite plant and the dynamite in use. Good material.

**A Visit to the Nitrate Fields of Chili.** E. I. duPont de Nemours & Co., Inc., Wilmington, Del. Free.

1 reel. Shows the fields and how materials are prepared for shipment.

**American Matchmaking.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

¼ reel. Making matches in a large factory.

**Keep Your Going Business Going.** Grinnell Co., Inc., Publicity and Promotion Department, 277 West Exchange St., Providence, R. I. Free.

1 reel. Telling the story of the application and operation of automatic sprinklers. Shows in detail operation under fire conditions.

**Science at Home No. 5.** Spiro Film Corporation, 161 Harris Ave., Long Island City, N. Y. Rent. Present price, \$1.50.

1 reel. The chemistry of the match.

**The Story of the Lucifer Match.** Church and School Film Exchange, 315 Polk Bldg., Des Moines, Iowa; Edited Pictures System, Inc., 130 West 46th St., New York City; Spiro Film Corporation, 161 Harris Ave., Long Island City, N. Y. Rent. \$1.50 to \$3.00.

1 reel. "The history of fire lighters and modern process of making matches." Very good material.

### Organic Chemistry

#### SUGAR

**Beets from Seed to Sugar Bowl.** United States Department of Agriculture, Office of Motion Pictures, Washington, D. C. Free.

1 reel. Modern sugar production as exemplified in the United States.

**Cane Sugar.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent. Present price, \$1.50.

1 reel. The cultivation of the cane and the extraction of the sugar.

**Cane Sugar Refining.** American Sugar Refining Co., 117 Wall St., New York City; J. Alexander Leggett Co., 2 W. 46th St., New York City. Free.

1 reel. From planting of cane in Cuba to finished product. Special emphasis on refining process. Very good for classroom use.

**Sugar Cane.** Ford Motion Picture Laboratories, Detroit, Mich. Sale only.

1 reel. Complete story, from the planting to the refined sugar.

**Sugar Cane and Cane Sugar.** United States Department of Agriculture, Office of Motion Pictures, Washington, D. C. Free.

1 reel. Similar to other reels in content. Scenes taken in United States.

**The Sugar Trail.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. Depicts the beet sugar industry, beginning with growth of wild beet and cultivation methods. Harvesting and manufacturing processes. Animated statistics show scope of beet sugar industry. Good material.

### Oxygen

**The Chemistry of Combustion.** Spiro Film Corp., 161-179 Harris Ave., Long Island City, N. Y. Rent. Present price, \$1.50.

1 reel. Shows a number of experiments to illustrate the principles involved in combustion and oxidation.

**Oxygen, The Wonder Worker.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill.; Air Reduction Sales Co., Motion Picture Division, 342 Madison Ave., New York City; United States Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

2 reels. Shows how liquid air is made and why oxygen can be taken from air in the process. Shows how acetylene is made and how both gases are used in the industry. Good.

**Liquid Air.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. How liquid air is produced and used in a number of interesting experiments.

### Precious Metals

**Beaten Gold.** Fox Film Corporation, 55th St. and 10th Ave., New York City. Rent.

1 reel. Story of its manufacture.

**Fine Arts in Metals.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

2 reels. Making sterling silver in the Gorham plant.

**Gold Mining in Alaska.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

$\frac{1}{4}$  reel. Gold mining as practiced in this northern country.

**A Movie Trip Through Filmland.** DeFrenes and Felton, Wilkes-Barre, Pa. Free.

2 reels. Shows complete process of manufacture as practiced at Kodak Park, Rochester, N. Y. Film stock made from raw cotton and silver bars. Excellent material.

**Silver Bullets.** George Kleine, 49 West 45th St., New York City. Sale.

1 reel, showing the transformation of raw materials to pure silver and thence into coins.

**The Silversmith.** Brown, H. S., 806 South Wabash Ave., Chicago, Ill.; Homestead Films, 732 South Wabash Ave., Chicago, Ill.; Sanford Motion Picture Service, 406 Englewood Ave., Chicago, Ill.; Ideal Pictures Corporation, 26 East 8th St., Chicago, Ill. Rent.

1 reel. Story of silver from the ore to the various silver articles used in the home.

### Silicon

**American Bottles—Old and New.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

2 reels. Shows modern glass practice and an automatic bottle blowing machine. (Owens.)



**Brick—From Clay to Pavement.** United States Department of Agriculture, Office of Motion Pictures, Washington, D. C. Free.

1 reel Shows the process of gathering the clay, and molding and forming the brick, and the use of the brick.

**Cementing the Centuries.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill.; Alpha Portland Cement Co., 13 South 3rd St., Easton, Pa.; 165 West Wacker Drive, Chicago, Ill. Free.

2 reels. The story of Alpha Cement.

**Lenox Pottery.** H. O. Davis, 106 South Hudson St., Oklahoma City, Okla.; J. Alexander Leggett Co., 2 West 46th St., New York City. Free.

2 reels. Fine pottery produced by modern methods.

**Magic Clay.** Coöperative Film Exchange, 284 Turk St., San Francisco, Calif.; 1912 South Vermont Ave., Los Angeles, Calif.; Carter Cinema Producing Corp., 551 Fifth Ave., New York City. Rent only.

1 reel. Making Rookwood pottery in the Cincinnati workshops. Shown in Prizma color.

**The Most Ancient Art in History.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

½ reel. Shows growth of American pottery industry scenes at oldest pottery in United States.

**Porcelain Industry in Czechoslovakia.** Society for Visual Education, Inc., 327 South LaSalle St., Chicago, Ill. Rent.

1 reel. Complete process, from common clay to fine china.

**The Potter's Wheel.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. The manufacture of electrical porcelain from the mixing of raw ingredients to the finished product.

**Pottery.** Ford Motion Picture Laboratories, Detroit, Mich. Sale only.

1 reel. The art of pottery making throughout the ages; trip through a modern plant.

**The Romance of Carborundum.** The Carborundum Co., Niagara Falls, N. Y. Free.

1 reel. Showing the production of carborundum and the use of abrasives.

**The Romance of Glass.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill.; Church Film Co., 1108 Boylston St., Boston, Mass. Free.

1 reel. Historical account of discovery of glass. Shows modern methods in comparison with hand-blowing. Film ends with cold-pack canning pictures.

**Sevres Porcelain.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent. Present price, \$1.50.

1 reel. Manufacture of this fine type of porcelain.

**The Story of Abrasives.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

4 reels. Reel 1 shows how Niagara power is used in electric furnaces to make carborundum. Reels 2, 3, and 4 show manufacture of various utensils made from carborundum and their use in industry.

**The Story of Fire-Clay Refractories.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

4 reels. First two reels deal with mining of clay and manufacture of bricks. Reels 3 and 4 show use of fire-clay in glass industry, in coke-ovens, in electric furnaces, etc.

**The Story of Portland Cement.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill.; J. Alexander Leggett Co., 2 West 46th St., New York City; U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

1 reel. Manufacture of cement from rock quarries to final powder form. Some uses also shown.

**Story of the Willow Plate.** George Kleine, 49 West 45th St., New York City. Distributes through University Extension Divisions. Sale.

1 reel. The story back of Chinese design. Good material, but concerns the artistic rather than the chemical.

**Uncommon Clay.** Fox Film Corp., 55th St. and 10th Ave., New York City. (Many exchanges). Rent.

1 reel. Manufacture of pottery.

### Sodium

**Pillars of Salt.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. Shows mining and refining. Many scenes taken many feet below ground.

**Salt of the Earth.** Fox Film Corp., 55th St. and 10th Ave., New York City. (Many exchanges). Rent.

1 reel. Salt mining in New York state and preparation for shipment. Very good material.

**Salt Mining.** Pilgrim Photoplay Exchange, 804 South Wabash Ave., Chicago, Ill. Rent.

1 reel. Title is self-explanatory.

**Taken with a Grain of Salt.** Ford Motion Picture Laboratories, Detroit, Mich. Sale.

1 reel. "Drilling and dynamiting in solid walls of tunnel." Filling sacks and boxes.

### Structure of Matter

**Beyond the Microscope.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. Although primarily dealing with electrolysis, it shows at some length how molecules are constituted.

### Sulphur

**Experiments with Sulphur.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent. Present price, \$1.50.

1 reel. Shows uses of this substance both in the laboratory and commercially.

**The Story of Sulphur.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent. Present price, \$1.50.

1 reel. Mining, refining, and use.

**The Story of Sulphur.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

2 reels. "How it is melted, 1,000 feet below the earth's surface by superheated water and forced by compressed air to the surface and stored in huge vats; huge pipe lines to sulphur fields. Building of vats, blasting of hardened sulphur, and loading into box cars and ships."

### Tin and Lead

**Pigs of Lead.** Rothacker Industrial Films, Inc., 7510 North Ashland Ave., Chicago, Ill. Free.

1 reel. The mining and smelting processes. Designed to be used with "The Story of White Lead."

**Story of Lead Mining and Milling.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

3 reels. Reel 1 shows lead production by countries and states, prospecting, driving of tunnels, and actual mining. Reel 2 shows ore transportation, crushing of ore, and treatment. Reel 3 shows completion of treatment and general factory scenes.

**Story of Lead Smelting.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

2 reels. Reel 1 shows extraction of crude lead from ores. Reel 2 shows the smelter at Alton, Ill., and the refining of the metal; it also shows health measures to prevent lead poisoning among workers.

**The Story of White Lead.** Rothacker Industrial Films, Inc., 7510 North Ashland Ave., Chicago, Ill. Free.

2 reels. From the lead "pig" of the preceding film to the painter's raw materials.

### Water

**Crystals and Their Beauties.** Standard Motion Picture Service, Inc., 1906 South Vermont Ave., Los Angeles, Calif., or 130 W. 46th St., New York City. Rent.

1 reel. Microscopic pictures of crystal formations.

### Zinc Family

**Quicksilver and Its Properties.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent. Present price, \$1.50.

1 reel. How it is mined and some of its uses.

**Science at Home.** No. 8. Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent. Present price, \$1.50.

Properties of mercury.

**The Story of Asbestos.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

3 reels. Mining of asbestos in Arizona and Quebec; manufacture into various products at Manville, N. J. Reel 2 is concerned with various steps in the manufacture, and Reel 3 shows use and tests of asbestos.

### Miscellaneous

**For the Feet of a Nation.** DeFrenes and Felton, Wilkes-Barre, Pa. Free.

2 reels. The manufacture of linoleum.

**The Jewels of Industry.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

2 reels. The manufacture and use of modern abrasives.

**MOTION PICTURES**

**Chemistry.** (Add other materials in space below.)

## E. PHYSICS

## Electricity

## GENERAL

**Back of the Button.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City; Rothacker Industrial Films, 7510 North Ashland Ave., Chicago, Ill. Free.

1 reel. "Visualizing the tremendous power at work behind the little electric button."

**Benjamin Franklin's Return.** Rothacker Industrial Films, Inc., 7510 North Ashland Ave., Chicago, Ill. Free.

1 and 2 reels. "Electricity and its varied usefulness in our everyday lives; story of conversion of coal into electrical energy." Good material.

**Big Deeds.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. Various spectacular "big deeds," most of them electrical.

**The Death Ray.** Pathé Exchange, Inc., 35 West 45th St., New York City. (Many branch offices.) Rent.

2 reels. Depiction of machinery used in projection of H. Grindell Mathew's invention. Also something of the ray itself.

**Thos. A. Edison.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. His visit to General Electric laboratory; also something of incandescent lamp manufacture.

**Electricity.** Carter Cinema Producing Corp., Evans Film Laboratory, 1476 Broadway, New York City. Rent.

4 reels. "How it is generated and controlled; its application to our varied daily needs"

**Electricity.** Gillette Camera Stores, 117 Park Ave., New York City. Rent.

14 reels. Includes study of the principles of—Magnetism, Electrostatics, Current Electricity, Electromagnetism, Current Generation, Electrical Measurement.

**Electricity in the Motor Car.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City. Free.

1 reel. General in its nature and accordingly good for review in electricity. Also listed under "Induction."

**An Electrified Travelogue.** Westinghouse Electric Mfg. Co., East Pittsburgh, Pa. Free.

2 reels. Short history of transportation up to railroad electrification. How electric engines are built. Ride on electric locomotive.

**The Farm Electric.** Visugraphic Pictures, 247 Park Ave., New York City. Rent.

1 reel. How electricity can be used to make farm labor less arduous and farm life more pleasant. Good material.

**The Go-Getter.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill.; Western Electric Co., 120 West 41st St., New York City. Free.

4 reels. Story of a farm regenerated through use of electric appliances. An interesting story runs through the picture. Valuable for rural schools, but more for entertainment than for classroom instruction.

**Edison Service in Industry.** New York Edison Co., Bureau of Education, 393 Seventh Ave., New York City. Free.

2 reels. Pictures taken from several manufacturing plants in New York City. Distribution limited to New York City.

**Jupiter's Thunderbolts.** University Extension Divisions. Consult nearest agency. Free.

1 reel. Development of electricity and manufacture of storage batteries.

**The King of the Rails.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

3 reels. Evolution of transportation; electric locomotive in Rockies.

**Red Wing Experimental Light Line.** Northern States Power Co., Minneapolis, Minn. Free.

3 reels. "Before and after the farmer uses electricity and how electricity can be used on the farm." Good for schools in rural districts.

**Science at Home.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. "Electrical and Mechanical Experiments."



**Story of a Spark Plug.** Atlas Educational Film Co., 1111 South Boulevard, Oak Park, Ill., or U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

2 reels. Manufacture and use of spark plugs. Mining of sillimanite used in construction. Excellent.

**Westinghouse Works.** Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa. Free.

2 reels. "A trip through the various factories. Electrical products are shown in process of manufacture"

**Yours to Command.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City; Rothacker Industrial Films, Inc., 7510 North Ashland Ave., Chicago, Ill. Free.

1 reel. "Visualizing services of electricity, power and light as used by industries, commerce, and in the home." Good material.

#### APPLIANCES

**A Modern Kitchen.** New York Edison Co., Bureau of Education, 393 Seventh Ave., New York City. Free.

1 reel showing the saving in time due to an electrically equipped kitchen. Also "Saving the Day," and "New Ways for Old," showing modern methods in the home. 1 reel each.

#### BATTERIES

**The Amber Soul.** Atlas Educational Film Co., 1111 South Boulevard, Oak Park, Ill. Free.

1 reel showing the manufacture of storage batteries.

**Portable Electricity.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill.; J. Alexander Leggett Co., 2 West 46th St., New York City. Free.

2 reels. The theory, manufacture, and use of the Edison alkaline storage battery. Good material.

**The Story of a Storage Battery.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

2 reels. Reel 1 deals with uses of a battery; Reel 2 with the manufacture of the battery. (Willard.)

**Volta's Discovery.** Atlas Educational Film Co., 1111 South Boulevard, Chicago, Ill. Free.

1 reel. Leads from Volta's discovery to invention of modern storage battery by Willard. Historical in character. Good material.

## BIOGRAPHY

**The Benefactor.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

3 reels. "Life of Edison, told in interesting episodes from the age of five to present."

## CABLES

**Land Cable Service.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

2 reels. Title is self-explanatory.

**Linking the Three Americas.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

1 reel. "How ocean cables connect the continents."

**Marine Cable Laying.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

2 reels. Laying of cable with the difficulties attendant upon work at sea.

**Repairing a Sub-Sea Cable.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

$\frac{1}{4}$  reel. Raising a trans-Atlantic cable for examination and repair.

**Speeding Up Our Deep Sea Cables.** Western Electric Co., Motion Picture Bureau, 120 West 41st St., New York City. Free.

2 reels. "Camera record of the laying of permalloy cable between New York and the Azores—the world's fastest ocean telegraph."

## ELECTRIC WIRE CONSTRUCTION AND MANUFACTURE

**The Conductor.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. "Making lamp cord from copper, cotton, rubber, silk."

**Voice Highways in the Making.** Western Electric Co., Motion Picture Bureau, 120 West 41st St., New York City; Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City. Free.

1 reel. Manufacture of lead-covered cable. Shows detail of operation of big cable-sheathing presses.

#### INCANDESCENT LAMP

**Making Mazda Lamps.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. Shows complete process, from the raw materials to the finished lamp. Good material.

#### INDUCTION

**The Burning Question, Ignition.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

2 reels. The importance of ignition in the gas engine.

**Electricity in the Motor Car.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

1 reel. A complete depiction of the role of electricity in the motor car. Animated drawings used to show what takes place in the cylinders.

**High Frequency Currents.** Society for Visual Education, 329 South LaSalle St., Chicago, Ill. Rent.

1 reel. Demonstrated in the Ryerson Laboratory of Cornell University.

**How the Generator Works and Why the Starting Motor Starts.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City. Free.

2 reels. Shows the principle of induction as applied to the generator.

**One for Two—The Starter Generator.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City. Free.

1 reel. Title is self-explanatory.

#### INSTRUMENTS

**Story of Electric Meter.** U. S. Bureau of Mines Experiment Station, Pittsburgh, Pa. Free.

3 reels. Reel 1 shows manufacture of magnet steel; Reel 2 demonstrates making permanent magnets; Reel 3, assembling instruments. Put out by Sangamo Electric Co.

**Electrical Measuring Instruments.** Weston Electrical Instrument Corp., Newark, N. J. Free.

1 reel. Shows the "instruments actually operating and then animates the principle so that the student can get a thorough knowledge of the way in which it operates."

#### LIGHTING

**Behind the Signs on Broadway.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

½ reel. "Shows how the largest electric sign in the world is operated."

**Bringers of Light.** Iowa State College, Agricultural Extension Dept., Ames, Iowa. Probably free.

1 reel. Shows manufacture of Mazda lamps.

**Light of a Race.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. "Principal steps in development of artificial illumination from earliest beginnings to the incandescent lamp."

#### MAGNETISM

**The Electric Bell.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

¼ reel. Showing construction and operation.

**Electromagnetic Induction.** Society for Visual Education, 329 South LaSalle St., Chicago, Ill. Rent.

1 reel. "Important experiments with elaborate equipment such as only a great university possesses."

**Electromagnetism.** Society for Visual Education, 329 South LaSalle St., Chicago, Ill. Rent.

2 reels. "Fundamental relations of electricity and magnetism."

**The Magnet.** Beseler Film No. 3006. Various State Departments of Education, or State Museums. Rent or free.

1 reel. A very comprehensive series of experiments showing the important facts of magnetism.

**Magnetism.** Society for Visual Education, 329 South LaSalle St., Chicago, Ill. Rent.

1 reel. "Fundamental properties of magnetism."

**Magnetism and Electromagnets.** Geo. Kleine, 49 West 45th St., New York City. Sale.

6 reels. Averaging about 500 feet each, dealing with both natural magnets and electromagnets and the molecular theory of magnetism. Photographed in the Edison studios.

**Studies in Magnetism.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

$\frac{1}{2}$  reel. Demonstrations to show natural magnets, permanent magnets and electromagnets.

#### MOTORS AND DYNAMOS

**At Your Service.** New York Edison Co., Bureau of Education, 393 Seventh Ave., New York City. Free.

4 reels. The generation and distribution of electricity in New York City. Distribution limited to New York City. "The Electric Heart of New York" is a shorter and less technical equivalent of the above. Two reels.

**The Busy-Body.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. The smallest motor self-assembled by its 175 parts.

**Crops and Kilowatts.** U. S. Department of Agriculture, Office of Motion Pictures, Washington, D. C. Free.

1 reel. Shows a great hydro-electric development in the Sierra National Forest.

**The Electrical Giant.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. Manufacture of 50,000 horse-power steam turbine generator, largest in world.

**From Coal Pile to Power House.** The New York Edison Co., Bureau of Education, Motion Picture and Lecture Division, 393 Seventh Ave., New York City. Free.

The stages "by which the inherent energy of coal is changed into electricity." One reel.

A somewhat similar film, "The A B C of Electricity," showing the generation of electricity by animated drawings is also obtainable. One reel.

**Harnessing the Waves.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

1 reel. Backward sweep of ocean waves used as source of power for storage battery charging.

**Story of Water Power.** U. S. Bureau of Mines Experiment Station, Pittsburgh, Pa. Free.

2 reels. Story of uses of water power up to modern harnessing of Niagara.

**Super-Power Generation.** Pennsylvania-Ohio Power and Light Co., Youngstown, Ohio. Free.

1 reel. Modern power production.

**White Coal.** Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa. Free.

2 reels. Electricity as developed from snowflakes. Animated drawings show working of turbine-generator.

**Why a Magneto.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City. Free.

2 reels. "Physical and mechanical principles behind the operation of this appliance"

### RADIO

**The Audion.** Western Electric Co., Motion Picture Bureau, 120 West 41st St., New York City. Free.

2 reels. An excellent explanation of the action of the radio tube in a circuit.

**Listening In.** Rothacker Industrial Films, Inc., 7510 North Ashland Ave., Chicago, Ill. Free.

1 reel. Shows the manufacture of an A. C. tube receiving set; also an inside view of a well-known broadcasting station.

**The Magic of Communication.** Western Electric Co., Motion Picture Bureau, 120 West 41st St., New York City. Free.

2 reels. A new production on the operation of the vacuum tube in telephone work. Designed to replace the older reel, "The Audion," put out by the same company. Excellent material.

**The Radio Telephone.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City. Free.

2 reels. Explaining the operation.

**The Re-awakening of Rip Van Winkle.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City. Free.

2 reels. "Wherein the Slumbering Dutchman awakens and is initiated into the mysteries of the modern broadcasting station."

**Safety at Sea.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City. Free.

2 reels. "Comprehensive story of marine radio; an indispensable institution protecting life and property on the high seas."

**Trans-Oceanic Radio.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City. Free.

2 reels. "Pictorial digest of the world's largest and most remarkable trans-oceanic radio communication system."

**The Wizardry of Wireless.** General Electric Co., 1 River Road, Schenectady, N. Y.; New Jersey State Museum, Trenton, N. J. Free.

2 reels. "Brief history of communications; animated drawings explaining from a technical standpoint the principles involved in wireless."

**Wireless Telephony.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent. New Jersey State Museum, Trenton, N. J. Free.

$\frac{1}{2}$  reel. "How sound waves are carried by electric waves, transmitted through space and reconverted into sound waves thousands of miles from their source."

### STATIC

**Benjamin Franklin.** Church and School Film Exchange, 315 Polk Building, Des Moines, Iowa; Church Film Co., 1108 Boylston St., Boston, Mass.; Edited Pictures System, Inc., 130 West 46th St., New York City; Film Classic Exchange, Fredonia, N. Y.; Pilgrim Photoplay Exchange, 804 South Wabash Ave., Chicago, Ill.; Pinkney Film Service Co., 1028 Forbes St., Pittsburgh, Pa.; Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. From boyhood to his life in the city of Philadelphia. Rather general for use in science classes, but would help to make Franklin a real character for students.

**Electrostatics.** Society for Visual Education, 329 South LaSalle St., Chicago, Ill. Rent.

1 reel. "Experiments photographed in the Ryerson Laboratory, University of Chicago."

**Simple Experiments in Electricity.** Beseler Film. Various State Departments of Education or State Museums.

½ reel. A large number of experiments on the subject.

#### TELEPHONE AND TELEGRAPH

**Behind the Scenes.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

1 reel. "In a Telephone Office"

**The Inside Story of the Telephone.** Western Electric Company, Motion Picture Bureau, 120 West 41st St., New York City. Free.

2 reels. A new motion picture based upon the book, "From the Far Corners of the Earth." The picture traces the raw materials back to their sources.

**Treat 'Em Right and That Little Big Fellow.** New Jersey Bell Telephone Co., Motion Picture Dept., Room 1060, Broad St., Newark, N. J. Both free.

Comedies. "Treat 'Em Right." An animated cartoon. "That Little Big Fellow" is one of the best educational films. For science clubs.

**My Hero.** New Jersey Bell Telephone Co., Motion Picture Dept., Room 1060, Broad St., Newark, N. J. Free.

Comedy. Good humor. A "scream from start to finish." For science clubs.

**The Day We Celebrate, The Honor of the Job, and Some Folks and the Telephone.** New Jersey Bell Telephone Co., Motion Picture Dept., Room 1060, Broad St., Newark, N. J. Free.

Dramatic photoplays. "The Day We Celebrate" is a sketch with plenty of patriotic action. Appeals particularly to young people. "The Honor of the Job" is thrillingly dramatic. "Some Folks and the Telephone." Scenes pulsate with action. A most popular film. Good for science clubs. Each, 1 reel.



**The Electrical Transmission of Speech.** Western Electric Co., 120 West 41st St., New York City. Free.

1 reel. An excellent film showing the complete action of a telephone. Furnishes a review of important facts of sound.

**I See You Calling Me.** New Jersey Bell Telephone Co., Motion Picture Dept., Room 1060, Broad St., Newark, N. J. Free.

Highly educational and interesting. Features pictures by wire. Similar pictures are "Crossroads of Conversation," showing how "the girl with the smile" handles them. "A Prophecy Fulfilled" is scenic and educational. "Pictures by Wire," instructive and interesting. "Long Drawn Out," a snappy little journey through a busy wire mill. Each, 1 reel.

**Principle Becomes a Practical Art.** New Jersey Bell Telephone Co., Motion Picture Dept., Room 1060, Broad St., Newark, N. J. Free.

Features telephone's amazing progress. Clever photography. Other films are as follows: "When the Telephone Was Young." Introduces Alexander G. Bell, father of the telephone, in 1876, and his helper. "Building for Service." Good entertainment. "Auxiliary Products of Telephone Research." Interesting electrical equipment developed by telephone engineering. "Voices Across the Sea." Animated picture photography. Very popular and instructive. Each, 1 reel.

**How the Telephone Talks.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

½ reel "Principles of communication by telephone. Details of transmitter and receiver."

**Making Telephone History.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

1 reel. "The story of the evolution of the telephone." Excellent material."

**Neighbors of the Wire.** National Motion Picture Bureau, 25 Pemberton Square, Boston, Mass. Free.

1 reel. Produced for New England Telephone and Telegraph Co.

**Putting a Telephone Together with Trick Photography.** Western Electric Co., Motion Picture Bureau, 120 West 41st St., New York City. Free.

1/3 reel. An interesting short subject.

**Something About Switchboards.** Western Electric Co., Motion Picture Bureau, 120 West 41st St., New York City. Free.

¾ reel. Making and installing equipment in a modern exchange.

**Speeding the Spoken Word.** Society for Visual Education, 329 South LaSalle St., Chicago, Ill. Rent.

1 reel. Complete story of a telephone system from poles to central exchange.

**The Telephone—A Modern Marvel.** Western Electric Co., Motion Picture Bureau, 120 West 41st St., New York City. Free.

2 reels. Development and manufacture of telephone equipment.

**The Telephone Call.** Western Electric Co., Motion Picture Bureau, 120 West 41st St., New York City. Free.

½ reel. Tracing the voice through various pieces of apparatus.

**Telephone Inventors of To-day.** Western Electric Co., Motion Picture Bureau, 120 West 41st St., New York City. Free.

3 reels. "Inside one of America's best equipped and most expertly manned centers for scientific experiment and operation."

**The World's Telephone Workshop.** Western Electric Co., Motion Picture Bureau, 120 West 41st St., New York City. Free.

1 reel. A detailed depiction of the big factory devoted to the task of creating the instruments of speech.

#### TRANSFORMER

**Power Transformers.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

2 reels. Development and manufacture of transformers used in power line substations.

#### X RAY

**Revelations by X Ray.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. "Electrical action in producing X rays and power of X rays to reveal inner structure of opaque objects." Excellent.

**Heat****DEW**

**Marvels of the Universe—Dewfall.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

$\frac{1}{4}$  reel. Formation of dew and microscopic appearance of dew and frost.

**HEATING SYSTEMS**

**A Close-up of Stoker Combustion.** Riley Stoker Corp., Worcester, Mass. Free.

2 reels. "Operation of an underfed stoker. Technical." Only fair material for high school use.

**Controlled Heat.** Hoffman Specialty Co., Inc., Dept. C. 37, 25 West 45th St., New York City. Free.

3 reels. From the heating difficulties of the ancient cave man to to-day's most efficient heating system. Shows the operation of a vapor-vacuum system and something of the Hoffman Controlled Heat Installation. Good material.

**The Spencer Heater.** Spencer Heater Co., Williamsport, Pa. Free.

3 reels. Title is self-explanatory.

**HEAT TRANSFER**

**Experiments in Conduction of Heat.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

$\frac{1}{2}$  reel. "Elementary laboratory experiments."

**HIGH TEMPERATURE**

**Story of Heat Treatment of Steel.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

2 reels. Shows change in physical properties of steel due to high temperatures. Pictures taken at Hupp automobile works.

**INSULATION**

**Saving Coal at Home.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa.; Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City. Free.

1 reel. Drives home the necessity for insulation for furnaces. Costumes of people concerned rather ancient.

## LIQUID AIR

**Beseler Film.** Nos. 3003, 3004. Various state colleges. Rent.

The Beseler films are no longer available through ordinary channels, but on the dissolving of the producing company were purchased by several state colleges and Yale (possibly) as well. These films contain many fine experiments with liquid air. Each, 1 reel.

**Liquid Air.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. How liquid air is produced and used in a number of interesting experiments.

**Oxygen, the Wonder Worker.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

4 reels. Reel 1 shows the construction of the oxy-acetylene welding torch and a little of the properties of liquid air; Reel 2 shows how air is liquefied and pure oxygen obtained from it; Reel 3 and Reel 4 are devoted to various welding and cutting uses of the oxy-acetylene flame. Reels 1 and 2 are particularly valuable.

## REFRIGERATION

**The Servel.** Servel Corp., 51 East 42nd St., New York City. Free.

2 reels. The story of an electric refrigerator.

## SNOW

**Mysteries of Snow.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent. New Jersey State Museum, Trenton, N. J. Free.

1 reel. "Pictures of the romance of snow. Beauty of snow flakes and different kinds of crystals."

## STEAM ENGINES

**The Electrical Giant.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. Primarily, as its name implies, on electricity, but in showing the manufacture of a 50,000 H. P. steam turbine much is brought out about that type of steam engine.

**Story of Power.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

3 reels. "Shows early development of the steam engine, modern uses of electricity, and by animated photography, the working of a steam turbine."

## THERMOMETRY

**T. C. (Your Sixth Sense).** Picture Service Corp., 71 West 23rd St., New York City, or 217 West Illinois St., Chicago, Ill. Free.

1 reel. Good introductory material to the subject of thermometry. Shows effect of temperature on human beings, origin of thermometer, and manufacture.

## Light

## COLOR

**A Runaway Taxi; Ouch; Luna-cy; Zowie.** Pathé Exchange, Inc., 35 West 45th St., New York City. Rent.

4 single reels. Valuable not for the subject matter of the films themselves, but for the stereoscopic effect produced when the pictures are viewed with the proper colored glasses. Interesting exemplification of color theory in practice.

**Sunbeams.** Film Classic Exchange, Fredonia, N. Y. Rent.

1 reel. "Composition of light and color; objects studied under varying light conditions."

## ECLIPSES

**Eclipse of the Sun.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

$\frac{1}{2}$  reel. "Animated technical drawings showing how an eclipse of the sun is caused and what it is like."

**The Eclipse of 1925.** Pictorial Clubs, Inc., 350 Madison Ave., New York City. Rent.

1 reel. "Made under the supervision of the Scientific American, showing every phase of the phenomenon."

## ELECTRIC LIGHTS

**Bringers of Light.** Iowa State College, Agricultural Extension Dept., Ames, Iowa. Probably free.

1 reel. "Manufacture of Mazda lamps." Excellent.

**The Glow of the Lamp.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. "Complete detailed study of electric lighting." Rather more of electricity than of light in this picture.

## LENSES

**Headlights.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City. Free.

2 reels. "A safety film showing necessity for good headlights." Of possible value in showing reflection from the rear of the headlight and refraction through the lens.

**How's Your Eyesight?** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

½ reel. "Explains the common ailments of the human eye, their causes and remedies. It combines animated drawings with actual photography."

**How You See.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent. General Vision Co., 104 West 42nd St., New York City. Rent. Pilgrim Photoplay Exchange, 1150 South Michigan Ave., Chicago, Ill. Rent. The Jersey State Museum, Trenton, N. J. Free.

¾ reel. "Theory of sight and principles common to eye and camera."

**The Human Eye.** Carter Cinema Producing Corp., Evans Film Laboratory, 1476 Broadway, New York City. Rent.

1 reel. "Structure of eye and care it should receive."

**The Light That Never Fails.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

¾ reel. "Giant coast lighthouse showing how 15,000 candle-power gas mantle and revolving prisms cast powerful light."

**Through Life's Windows.** New Jersey State Museum, Trenton, N. J. Free.

½ reel. The physiology of the eye and the causes of various eye defects.

## LIGHTING

**Lighting the Sea Lanes to New York Harbor.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Free.

1 reel. "Tracing the course of an incoming liner in New York harbor."

**Light of a Race.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. "Principal steps in the development of artificial illumination from the earliest beginning to the incandescent lamp."

## PHOTOGRAPHY

**A Movie Trip Through Filmiland.** DeFrenes and Felton, Wilkes-Barre, Pa. Free.

2 reels. "Cinema tour of Kodak Park, and interesting views of manufacturing film stock from raw cotton and bars of silver to finished strip ready for the camera."

## Mechanics

## ATMOSPHERE

**Science at Home. Story of the Atmosphere.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent.

1 reel. Title is self-explanatory.

## AUTOMOBILE

**A Horseless Carriage to a Horseless Age.** Studebaker Corp., South Bend, Ind. Free.

1 reel. "Story of manufacture of Studebaker car." Very good material.

**Proved.** Rothacker Industrial Films, Inc., 7510 North Ashland Ave., Chicago, Ill. Free.

2 or 4 reels. The General Motors Proving Grounds. Interesting material.

**The Story of an Automobile.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa.; Rothacker Industrial Films, Inc., 7510 North Ashland Ave., Chicago, Ill. Free.

5 reels. Shows in detail the various stages in the manufacture of the automobile.

**A True Product of Advanced Engineering.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City. Free.

2 reels. Recent improvements in the automobile motor.

## CAPILLARITY

**Thirsty Fibres.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City; New Jersey State Museum. Trenton, N. J. Free.

1 reel. Shows manufacture of paper and stresses the absorbent quality of the paper. Fair material but obviously advertising.

## CRYSTALS

**Crystals and Their Beauties.** Standard Motion Picture Service, Inc., 1906 South Vermont Ave., Los Angeles, Calif., or 177 Golden Gate Ave., San Francisco, Calif. Rent.

1 reel "Microscopic formations of various crystals by chemical and electrical means."

**Crystals in Formation.** George Kleine, 49 West 45th St., New York City. Sale.

A short subject showing the marvels of crystal formation of many types.

## ENGINEERING

**Building New York's Newest Subway.** E. I. duPont de Nemours and Co., Wilmington, Del. Free.

1 reel A Cameramic trip along the line of subway construction.

## FORCES

**The Bridges of New York.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Rent. Present price, \$1.50.

1 reel. Features of the construction of New York bridges.

**Building a Skyscraper.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City. Free.

2 reels. "The remarkable growth of a 32-story skyscraper, giving details of construction"

**How Brooklyn Bridge Was Built.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

½ reel. Animated drawings and photography.

**Swapping Foundations Under Skyscrapers.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

¾ reel. Taken during construction of Seventh Avenue Subway, New York City

## FRICTION

**The Story of Abrasives.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

4 reels. How Niagara power is used to generate electricity, and the manufacture and use of abrasives.



**Story of Lubrication.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

1 reel. Shows principle of lubrication.

#### HOOKE'S LAW

**Heat Treatment of Steel.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

2 reels. Primarily on heat but illustrates physical properties very well.

#### HYDRAULICS

**A Big City's Water Supply.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

$\frac{1}{4}$  reel. Ashokan Dam in Catskills, part of New York City water supply, and how it operates.

**Construction of a Subway Tube.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

$\frac{1}{4}$  reel. "New York's subway tubes beneath Harlem River."

**Nature's Frozen Credits.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill.; Picture Service Corp., 71 West 23rd St., New York City. Free.

3 reels. Building of a great water plant in the Sierra Nevada mountains of California.

**Our Mechanical Servant, the Elevator.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

$\frac{1}{2}$  reel. The principle and operation of hydraulic elevators.

**Roosevelt Dam.** World Educational Film Co., 732 South Wabash Ave., Chicago, Ill. Rent.

1 reel. Showing dam and surroundings.

**Spending Six Million a Day.** Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y.; Edited Pictures System, Inc., 71 West 23rd St., New York City; United Cinema Co., 120 West 41st St., New York City. Rent.

1 reel. New York's water supply, its source and uses.

**Water by Wire.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City. Free.

1 reel. Old and new methods of supplying water.

**The Water Supply of a Great City.** Ford Motion Picture Laboratories, Detroit, Mich. Sale.

1 reel. "Showing modern city systems compared to old methods."

**Water Works Wonders.** Better Service Film Co., Inc., 116 South Salina St., Syracuse, N. Y. Rent.

2 reels. "Novelty special."

#### MACHINES

**The Modern Goliath.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

4 reels. Features the use of heavy excavating machinery. Material can be used for review of simple machines. Fair.

**The Progress of Power.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City; International Harvester Co., 606 South Michigan Ave., Chicago, Ill. Free.

1 reel. Shows tractors adapted to the operation of a variety of machines. Can be used to introduce or review traction (friction), classes of machines, etc.

#### MOLECULES

**Beyond the Microscope.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. Although the main purpose of the film is to show electrolysis, a rather complete story of the molecule is presented.

#### PNEUMATICS

**The Air Pressure We Live In.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

1/3 reel. Experiments to show air pressure.

**The Riveter.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

1/2 reel. "Operation of pneumatic riveter. Bridges and other structures of New York built with its assistance."

**The Story of Compressed Air.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

2 reels. How compressed air is used to operate many devices used in modern industry.

## POWER

**The Progress of Power.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill.; International Harvester Co., 606 South Michigan Ave., Chicago, Ill. Free.

1 reel. Power serving industries and municipalities. Good material.

**Water Power.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

2 reels. Can be used to vitalize study of power. Comes more logically under the head of electricity.

## SPECIFIC GRAVITY

**Gravitation of Liquids.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

1/3 reel. Laboratory experiments to show the difference in specific gravity of various liquids.

**The Story of a Storage Battery.** U. S. Bureau of Mines, Experiment Station, Pittsburgh, Pa. Free.

2 reels. Reel 2 only part of interest in this connection.

## Sound

## HEARING

**How We Hear.** General Vision Co., 104 West 42nd St., New York City; Bray Productions, Inc., 729 Seventh Ave., New York City; Edited Pictures System, Inc., 71 West 23rd St., New York City; United Cinema Co., 120 West 41st St., New York City; Pilgrim Photoplay Exchange, 1150 South Michigan Ave., Chicago. Rent. New Jersey State Museum. Free.

1/4 reel. Primarily devoted to the physiology of the subject, but contains much material valuable in physics.

## MUSICAL INSTRUMENTS

**The Fine Art of Making Musical Instruments.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill.; Atlas Educational Film Co., 1111 South Boulevard, Oak Park, Ill. Free.

1 reel. The story of the manufacture of the first saxophone by Antoine Sax; also shows the manufacture by modern methods. Excellent material.

**Immortalized.** Y. M. C. A. Motion Picture Bureau, 120 West 41st St., New York City, or 1111 Center St., Chicago, Ill. Free.

1 reel. "Musical artists and how their work is preserved for posterity."

**Making the Harp and Piano.** U. S. Steel Corporation, Bureau of Safety, Sanitation, and Welfare, 71 Broadway, New York City. Free.

1 reel. Title is self-explanatory.

**Making the Organ.** U. S. Steel Corporation, Bureau of Safety, Sanitation, and Welfare, 71 Broadway, New York City. Free.

1 reel. Preparing the materials and assembling into the finished organ.

**The Making of a Piano, Pipe Organ, and Harp.** American Steel and Wire Co., 208 South LaSalle St., Chicago, Ill. Free.

2 reels. Title is self-explanatory.

**Music Factories.** Spiro Film Corp., 161 Harris Ave., Long Island City. Rent.

2 reels. "Showing the manufacture of mechanical musical instruments."

**The Violin Speaks.** Fox Film Corp., 55th St. and 10th Ave., New York City. (Many exchanges.) Rent.

1 reel. Shows the structure and manufacture of this stringed instrument.

#### SOUND PRODUCTION

**The Human Voice.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent. New Jersey State Museum, Trenton, N. J. Free.

½ reel "Organs of the throat and their function in producing sound."

#### SOUND WAVES

**The Electrical Transmission of Speech.** Western Electric Co., Motion Picture Bureau, 120 West 41st St., New York City. Free.

1 reel. As the title indicates, this film is primarily electrical in its nature. It does, however, bring in many items dealing with sound. Good for general review at end of year.

**Experiments in Physics-Sound Waves.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

$\frac{1}{4}$  reel. Demonstrating the underlying methods and devices for measuring length of waves. Photographed in physics laboratory of Cornell.

**Acoustics.** Johns-Manville Corp., 292 Madison Ave., New York City. Free.

1 reel. This company has recently announced for release early next year, a motion picture which will show "in motion, combinations of sound waves in models of auditoriums, supplemented by animated drawings."

### Miscellaneous

**Bates Road Tests.** U. S. Department of Agriculture, Office of Motion Pictures, Washington, D. C. Free.

1 reel. Building a road to be destroyed in testing.

**Beyond the Microscope.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

1 reel. Decomposition of water and action of gases. Action of molecules.

**Clouds.** U. S. Department of Agriculture, Office of Motion Pictures, Washington, D. C. Free.

1 reel. Types of clouds, etc. Good material.

**Einstein's Theory of Relativity.** Red Seal Pictures Corp., 1600 Broadway, New York City; Standard Film Service Co., 600 Film Building, Cleveland, Ohio. Rent.

2 and 4 reels. "Clear and understandable scientific explanation of principles involved; shorter version a 'popular' presentation; longer, including more scientific illustrations. Excellent material for physics classes."

**Experimental Physics.** United Projector and Film Corp., 228 Franklin St., Buffalo, N. Y. Rent.

The title of a series of 23 motion pictures dealing with every phase of physics, prepared under the supervision of Professor Henderson of Michigan. The reels available for rental are on the narrow width stock (28 mm.), but reels may be purchased in the standard width from the above address.

**Exploring the Upper Air.** U. S. Department of Agriculture, Office of Motion Pictures, Washington, D. C. Free.

1 reel. Studying upper air conditions to aid in weather prediction.

**Panama Canal.** General Electric Co., 1 River Road, Schenectady, N. Y. Free.

2 reels. An excellent account of the Panama Canal and of some of the difficulties attendant upon its construction. Shows large steam shovels at work; concrete mixers used in constructing the walls and the final blasting of the barrier which separated the Atlantic and Pacific. Would be good material to use at end of course to help show the different divisions of physics involved.

**Science of a Soap Bubble.** Pictorial Clubs, Inc., 350 Madison Ave., New York City; Spiro Film Corp., 161 Harris Ave., Long Island City, N. Y. Free.

1 reel. "Unusual properties of soap bubble." Good material.

**The Science of Weather Prediction.** Bray Productions, Inc., 729 Seventh Ave., New York City. Rent.

¼ reel. Title self-explanatory.

**Tests for Better Roads.** U. S. Department of Agriculture, Office of Motion Pictures, Washington, D. C. Free.

1 reel. Tests of materials and road building methods; unusual mechanical aids.

**Time.** General Vision Co., 104 West 42nd St., New York City. Rent.

1 reel. Brings out idea of time and difference between sun and lunar times. Might be used in connection with introduction of time unit.

**Watching the Weather Above.** U. S. Department of Agriculture, Office of Motion Pictures, Washington, D. C. Free.

2 reels. Only part of subject relevant to weather forecasting. Much of the picture deals with planes and balloons in flight.

**MOTION PICTURES**

**Physics.** (Add other materials in space below.)

## V. EQUIPMENT AND SUPPLIES

Science courses require more paraphernalia than most of the high school subjects, and careful attention should be given to the purchasing of materials. Unwise purchase fills shelves with dust-collecting objects, while, on the other hand, lack of equipment and supplies is a serious handicap. Nowadays, however, it seems to be unnecessary to err in either direction. The ability to plan carefully in conference with the many sources of advice, to secure bids from several dealers in laboratory supplies, and to convince administrators that money spent for equipment will pay dividends in better instruction—all these problems make ready information a necessity. Some sources of practical information are listed herewith.

The following list of firms is not at all exhaustive, but can be supplemented from the advertising sections of science magazines. Many of the companies have been listed without comment wherever the name of the catalog explains the nature of the supplies which they distribute.

### A. SUGGESTIONS ON CARE OF EQUIPMENT

**The Close of the Year.** E. S. Obourn. *The Science Classroom*, 250 Fourth Ave., New York City. Vol VII, p. 10, June 1928. 25c a year.

A short article with excellent suggestions on the care and ordering of materials.

**Dealers in School Laboratory Equipment and Supplies.** Division of Agricultural Instruction, Washington, D. C. Free.

A mimeographed leaflet of information.

**A Description of the Science Laboratories of the Lincoln School.** Earl R. Glenn, Charles W. Finley, and Otis W. Caldwell. Bureau of Publications, Teachers College, Columbia University, New York City. 45c.

Details of the arrangement and construction of these laboratories are explained and photographs of each are included.

**Division of Science Education.** The Board of Public Education, Philadelphia, Pa. Free.



This annual report for the year ended June 30, 1927, contains splendid photographs of high school science laboratories.

- A General Science Demonstration Desk with Filing System for Storing Apparatus.** C. W. Finley and E. R. Glenn. General Science Quarterly, Salem, Mass. Vol. 5:39-43, November 1920. 40c a copy

Similar article in "School Science and Mathematics," Vol. XX, No. 9, December 1920. Detailed plans of construction are given, with diagrams

- How to Store and Catalog Your Laboratory Stock.** Schwartz Sectional System, West Wilkins St. and Indiana Railroad, Indianapolis, Ind. Free.

A catalog, with good suggestions on orderly storage of equipment and supplies.

- Laboratory Layouts for High School Sciences.** A. C. Monahan. Bureau of Education, Bulletin 1927, No. 22. Superintendent of Documents, Washington, D. C. 31 pp. illus. 15c.

A brief discussion with description of equipment for the high school science courses; lists of supplies with approximate cost; diagrams and photographs of laboratories in typical schools.

- School Activities and Equipment.** Subtitle: A Guide to Materials and Equipment for Elementary Schools Rose B Knox. Houghton, Mifflin Co., Boston, Mass. \$2.00.

Discusses many phases of the selection, purchase, care, and use of school equipment, emphasizing the need of more concrete experiences for children. Such chapter headings as "The School Museum," "School Pictures," "Scientific and Social Activities and Materials," and the like, indicate a usefulness for teachers in the high school as well as in the elementary grades.

- Suggestions for Arranging and Keeping Up Apparatus and Materials in the Laboratory.** C. J. Quick. School Science and Mathematics. Mount Morris, Ill. Vol. 19. 123-130, February, 1919. 35c a copy.

Descriptions of shelves, cabinets, etc.

- A Unit System for Laboratory Apparatus.** O. R. Foster. School Science and Mathematics. Vol. 17: 508-510. June, 1917. Consult in library

"Organization of storage space." An illustrated article.

**EQUIPMENT AND SUPPLIES**

Suggestions on Care of Equipment. (Add other materials in space below.)

## B. SPECIAL CATALOGS FOR HIGH SCHOOL SCIENCE

**Aids to Visual Instruction.** The Stanley Bowmar Co., 2929 Broadway, New York City. Catalog free.

Charts, pictures, films, etc. Representative of Denoyer-Geppert Company.

**Agricultural and Biological Supplies.** Catalog B5. National Scientific Corp., 814 North Franklin St., Chicago, Ill. Free.

**Anatomical Models.** High School Dept. Catalog No. 3. H. Eisenstein Co., 88 Essex St., New York City.

**Biological and Agricultural Apparatus and Supplies.** Catalog B. W. M. Welch Scientific Co., Orleans St., Chicago, Ill. Free.

**Cambridge Botanical Supply Co. ("Cambosco")** Waverly, Mass. Catalogs free.

This company offers to prepare, without obligation, an "itemized list of apparatus and supplies, for any science, based on laboratory manual used," etc. Blank of particulars of offer will be sent on request. Also, equipment schedules as outlined in designated state course of study. Separate catalogs for biology, chemistry, and physics.

**Chemicals.** Catalog C. W. M. Welch Scientific Co., 1516 Orleans St., Chicago, Ill. Free.

Especially for high school courses in general science, biology, and chemistry.

**Equipment for the High School Physics Laboratory.** Eberbach and Son Co., Ann Arbor, Mich. Free catalog.

Based primarily on Carhute and Chute text. Other catalogs and lists available.

**Evans Equipment.** Catalog E. Central Scientific Co., 460 East Ohio St., Chicago, Ill. Free.

Lists the equipment for high school topics in electricity.

**Frohse Anatomical Charts.** Special Catalog. A. J. Nystrom and Co., 2249 Calumet Ave., Chicago, Ill. Free.

**General Biological Supply House.** (Turtlox) 761 East 69th Place, Chicago, Ill.

Supplies "printed lists of the recommended minimum equipment for high schools in any given state," also list of equipment and material based on any standard book. Special "Turtlox High School Biology Catalog" and "Turtlox Biological Red Book" sent on request. Both are well illustrated and contain many suggestions on teaching this subject. There are other catalogs, also a monthly bulletin, "Turtlox News," and booklets on various topics that are of special value to teachers; among others, "Common Diseases and the Germs That Cause Them," 50c. "Guide to the Study of Fresh Water Biology" and "Outline of Bird Study." \$1.00 each.

**Specimen Cases.** "Home Made" Scientific Apparatus Co., Mechanicsburg, Ohio.

**Laboratory Apparatus and Chemicals.** Catalog No. 7. Schaar and Co., 556 West Jackson Boulevard, Chicago, Ill. Free.

On pages 463 to 474 of this catalog are "Selected Lists of Apparatus and Chemicals," arranged according to size of class, textbook used, etc.

**Laboratory Apparatus for Physics and Chemistry.** Catalog G. W. M. Welch Scientific Co., 1516 Orleans St., Chicago, Ill. Free.

Planned especially for high school courses.

**Laboratory Equipment.** Catalog B-327. Central Scientific Co., 460 East Ohio St., Chicago, Ill.

Charts, models, museum specimens, projection equipment, lantern slides, instruments, etc., for courses in agriculture, biology, physical geography, and chemistry.

**Laboratory Equipment for Missouri High Schools.** Pamphlet MO. Central Scientific Co., 460 East Ohio St., Chicago, Ill. Free.

Based on the state syllabus. Similar pamphlets for other states and for certain textbooks are also available.

**Microscopes and Accessories for Educational Institutions.** Bausch and Lomb Optical Co., Rochester, N. Y. Free.

**Milvay Laboratory Equipment Guide.** Chicago Apparatus Co., 1735 North Ashland Ave., Chicago, Ill. Free.

A handbook in which is compiled the apparatus required in courses based on each of 22 commonly used textbooks in the high school sciences.

**Physics Apparatus.** Catalog 31-12-20-CEEB. L. E. Knott Apparatus Co., 79 Amherst St., Cambridge, Mass., or 70 Fifth Ave., New York City. Free.

Lists the apparatus required for specific experiments and topics in physics.

**Planned Harcourt Laboratory Equipments.** L. E. Knott Apparatus Co., 79 Amherst St., Cambridge, Mass., or 70 Fifth Ave., New York City. Free.

For the general science, biology, chemistry, and physics courses in Pennsylvania.

**School Maps, Globes, and Charts.** A. J. Nystrom Co., 2249 Calumet Ave., Chicago, Ill. Free catalog.

For geography, history, and biology. A wide range of illustrative materials is listed.

**Request for Laboratory Plan.** L. E. Knott Apparatus Co., 79 Amherst St., Cambridge, Mass., or 70 Fifth Ave., New York City. Free.

A form for recommended list of equipment based on designated textbook, manual, or state course of study.

**Scientific Apparatus and Supplies.** Catalog No. 23. E. W. A. Rowles Co., 2345 South LaSalle St., Chicago, Ill. Free.

For all high school courses in science. All types of materials are listed.

**Standard State Lists of High School Laboratory Equipment.** Central Scientific Co., 460 East Ohio St., Chicago, Ill. Free.

May be had as separate pamphlet for each state or for each standard textbook.

**Suggestions for Classroom Projection.** Bausch and Lomb Optical Co., Rochester, N. Y. Free.

**Tycos Instruments for Educational Institutions.** Catalog 5000S. Taylor Instrument Co., Rochester, N. Y. Free.

**University Apparatus Co.,** 2229 McGee Ave., Berkeley, Calif. Catalog free.

### C. GENERAL CATALOGS

**The A B C of Hydrogen-Ion Control.** Lamotte Chemical Products Co., McCormick Bldg., Baltimore, Md. Free.

Explanations of methods and equipment in testing water, soils, sewage, etc.

**American Instrument Co.,** 1220 D St., N.W., Washington, D. C.

**Apparatus for Industrial and Laboratory Use.** Palo Co., 153 West 23rd St., New York City.

**Baker and Adamson Reagents.** Catalog No. 86. E. H. Sargent and Co., 155 East Superior St., Chicago, Ill.

**Beck Bros.,** 421 Sedgley Ave., Philadelphia, Pa. Catalog S20.

**Chicago Apparatus Co.** Catalog No. 38. 1735 North Ashland Ave., Chicago, Ill.

**C. P. Chemical and Drug Co. (Gruebler),** 114 Liberty St., New York City.

**Chemical Laboratory Apparatus.** Catalog SE, 1927. Eimer and Amend, 18th St. and Third Ave., New York City.

**Eastern Science Supply Co.,** Post Office Box 1414, Boston, Mass.

**Empire Laboratory Supply Co.,** 559 West 132nd St., New York City.

**R. A. Fife Corp.,** Mamaroneck, N. Y. Representatives of E. H. Sheldon laboratory furniture, etc.

**Flint Glassware.** Whitall Tatum Co., 410 Race St., Philadelphia, Pa., or 225 Varick St., New York City.

**Gaertner Scientific Corporation,** 1201 Wrightwood Ave., Chicago, Ill.

**Hammer Apparatus.** Bulletin No. 178. Denver Fire Clay Co., 1742 Champa St., Denver, Colo.

Describes apparatus for studying and demonstrating radioactivity. Also gives a brief history of radium, its occurrence, extraction, crystallization, and uses.

**Jagabi Rheostats.** Catalog 1140. James G. Biddle Co., 1211 Arch St., Philadelphia, Pa.

**Laboratory Apparatus and Reagents.** Fisher Scientific Co., 709 Forbes St., Pittsburgh, Pa.

**Laboratory Rubber Tubings.** Arthur H. Thomas Co., West Washington Square, Philadelphia, Pa.

All types of laboratory apparatus and reagents.

**Laboratory Apparatus and Supplies.** Catalog III, Will Corp., Rochester, N. Y.

**Laboratory and Shop Equipment.** General Electric Co., Schenectady, N. Y.

One catalog for electrical departments of vocational and technical high schools; another for part-time and junior high schools.

**Leeds and Northrup,** 4901 Stenton Ave., Philadelphia, Pa.  
Electrical instruments.

**N. J. Laboratory Supply Co.,** 235 Plane St., Newark, N. J.

**Physical Apparatus Catalog.** Eberbach and Son, Ann Arbor, Mich.

**Physical Apparatus and Instruments.** Catalog F123. Central Scientific Co., 460 East Ohio St., Chicago, Ill.

**Psychology, Physiology Apparatus and Supplies.** List No 151, C. H. Stoelting Co., 424 North Homan Ave., Chicago, Ill.

**Pyrex Laboratory Glassware.** Corning Glass Works, Corning, N. Y., or 501 Fifth Ave., New York City.

**The School Buyers Guide.** Catalog No. 28. Columbus School Supply Co., 50 South Third St., Columbus, Ohio.

**School Supplies.** McKnight and McKnight, Normal, Ill.

For geography, nature study, physics.

**Scientific Apparatus and Chemicals.** Catalog No. 10. Denver Fire Clay Co., Denver, Colo.

**Scientific Dealers Supply Co.** Catalog Nos. C-6, B-5, and 7. 814 North Franklin St., Chicago, Ill.

**Scientific Equipment Co.,** 70 Fifth Ave., New York City.  
Sales representatives for Kewaunee furniture and Central Scientific Co.

**Scientific Laboratory Apparatus.** List No. 25. E. H. Sargent and Co., 155 East Superior St., Chicago, Ill.

**D. SCHOOL FURNITURE; LABORATORY TABLES**

**Chemical-Proof Laboratory Sinks.** Kewaunee, Wisc. Catalog Supplement.

**Columbia School Supply Co.,** 40 South Third St., Columbus, Ohio, or 314 West 17th St., Indianapolis, Ind.

Laboratory tables, cabinets, etc.

**Furniture for Laboratories.** Catalog F. W. M. Welch Co., 1516 Orleans St., Chicago, Ill.

**The Grand Rapids School Equipment Co.,** Grand Rapids, Mich.

Laboratory tables and school furniture.

**Laboratory and Vocational Furniture.** Catalog No. 14. Leonard Peterson and Co., 1222 Fullerton Ave., Chicago, Ill.

**Lincoln Science Desks.** Catalog Supplement. Kewaunee Mfg. Co., Kewaunee, Wisc.

**School Furniture.** The Federal Equipment Co., Carlisle, Pa.

**Sheldon Furniture.** E. H. Sheldon and Co., Muskegon, Mich.

**Wiese Laboratory Furniture Co.,** Manitowoc, Wisc

**E. MICROSCOPES AND OTHER OPTICAL EQUIPMENT**

**Memoscope and Memo Copier.** Agfa Ansco Corp., Binghamton, N. Y.

Free booklet, "The Memo Idea in Visual Instruction," on request.

**Bausch and Lomb Optical Co.,** Rochester, N. Y.

**C. P. Goerz American Optical Co.,** 317 East 34th St., New York City.

Principally lenses and devices. "Lomara," a pocket microscope.

**E. Leitz, Inc.,** 60 East Tenth St., New York City.

Microscopes, optical equipment, "Elei" museum jars, etc.



**Carl Zeiss, Jena.** 485 Fifth Ave., New York City, or 728 South Hill St., Los Angeles, Calif.

Microscopes and other optical equipment.

**Du Maurier Co.,** Elmira, N. Y.

Binoculars, etc.

**New Era Optical Co.** Catalog No. 15. 17 North Wabash Ave., Chicago, Ill.

**Spencer Lens Co.,** Buffalo, N. Y., or 32 West 42nd St., New York City.

**Walter F. Martini,** 2 Stone St., New York City.

Tami, Hensoldt, Mirakel: microscopes, binoculars, etc.

## F. PROJECTION EQUIPMENT

**Acme Division.** International Projector Corp., 90 Gold St., New York City, or 1134 West Austin Ave., Chicago, Ill.

**Balopticons, Micro Projectors, Etc.** Bausch and Lomb Optical Co., Rochester, N. Y.

**Charles Beseler Co.,** 131 East 23rd St., New York City.

**Brayco Still Film Projection.** Bray Studios, Inc., 729 Seventh Ave., New York City. \$36.00.

Operates on any electric current or automobile battery. Projects on wall or daylight screen. Uses any film slides. Also film adaptor, for use on any balopticon. \$38.50.

**Ciné-Kodak.** Eastman Kodak Co., Rochester, N. Y.

A motion-picture camera for the amateur. Models from \$60.00. Kodascope is the projecting machine to match. \$70.00 up.

**DaLite Screen and Scenic Co.,** 922 West Monroe St., Chicago, Ill.

**Delineascopes and Projection Accessories.** Spencer Lens Co., Buffalo, N. Y.

**DeVry Corporation,** 1091 Center St., Chicago, Ill., or 131 West 42nd St., New York City.

**Kolograph Corporation,** 130 West 42nd St., New York City.

Equipment, including combined motion picture projector and stereopticon.

**McIntosh Lantern and Slide Service**, 30 East Randolph St., Chicago, Ill.

**Portable Projector.** Holmes Projector Co., 1638 North Halsted St., Chicago, Ill.

**S. V. E. Film Stereopticon.** Society for Visual Education, 327 South La Salle St., Chicago, Ill. \$55.00.

**Trans-Lux Daylight Picture Screen**, 247 Park Ave., New York City.

Makes darkening the room unnecessary.

**Victor Portable Stereopticon.** Victor Animatograph Co., Davenport, Iowa. \$56.00.

**What Does the Work of Many Microscopes?** Cambridge Botanical Supply Co., Waverly, Mass.

Apparatus for projecting microscopic slides and living organisms on the screen without the use of a microscope.

**EQUIPMENT AND SUPPLIES**

atalogs and Apparatus. (Add other materials in space below.)

### G. MINERALS AND FOSSILS

**Collections of Fossils for Schools.** Price list No. 115. Ward's Natural Science Establishment, 84 College Ave., Rochester, N. Y. Free.

**The Collection of Minerals.** H. P. Whitlock. American Museum of Natural History, 77th St. and Central Park West, New York City. 15c.

An illustrated guide leaflet.

**Geology, Mineralogy, and Paleontology Specimens.** Kny-Scheerer Corp., 10 West 25th St., New York City. Catalog Free.

**Mineral Specimens.** R. M. Wilke, P. O. Box 312, Palo Alto, Calif. List free.

**Minerals and Rocks.** Price list No. 276. Ward's Natural Science Establishment, 84 College Ave., Rochester, N. Y. Free.

### H. BIOLOGICAL SPECIMENS

**The American Entomological Co.,** 1040 De Kalb Ave., Brooklyn, N. Y.

**Anatomical Material.** H. A. Walters, P. O. Box 4074, West Philadelphia Sta., Pa.

**Biology Catalog.** No. 5B. Denoyer-Geppert Co., 5235 Ravenswood Ave., Chicago, Ill.

Charts, models, specimens, slides, etc., for high school and college courses.

**Biological Red Book.** "Turtox" catalog. General Biological Supply House, 761 East 69th Place, Chicago, Ill.

Other catalogs: "Jewel Models," "Apparatus Catalog," "Microscope Slides," "Taxidermy Circular," "Museum Catalog," etc.

**Biological Supplies.** Catalog No. 40. Ward's Natural Science Establishment, 84 College Ave., Rochester, N. Y.

Other catalogs on "Entomological Supplies," etc. This company, now owned by the University of Rochester, carries many kinds of specimens and supplies.

**Biology.** Catalog No. 6. New York Biological Laboratory, 34 Union Square, New York City.

Lists charts, microscopes, lantern slides, dissecting sets, and other apparatus. Catalogs 6A and 6P for specimens, living and preserved.

**Booth Fisheries Co.,** 205 North Michigan Ave., Chicago, Ill., or 30 Fulton Fish Market, New York City.

Fish and other aquatic creatures

**Brooklyn Biological Laboratories,** 2 Lafayette Ave., Brooklyn, N. Y.

Living and preserved animal materials.

**The Butterfly Store,** 300 Fifth Ave., New York City.

Butterflies, moths, and other insects, as specimens and novelties  
Also specimens of minerals.

**F. J. Burns and Co.,** 1108 West Randolph St., Chicago, Ill.

Living frogs, turtles, etc.

**Dealer in Insects.** H. Sinclair, Box 1424, San Diego, Calif.

Handles all types of specimens. Can use amateurs as collectors for him in all parts of the world. Illustrated prospectus, with directions for collecting. roc.

**Drug Collections and Botanical Supplies.** Eli Lilly and Co., Indianapolis, Ind.

A very useful little catalog.

**Far-Western Wild Life Co.** Dr. W. E. Gordon, Mgr., Loma Portal, San Diego, Calif.

Desert and marine specimens.

**Hoagland Laboratory.** Miss M. Reilly, 335 Henry St., Brooklyn, N. Y.

All living materials for laboratory work can be obtained at this address.

**H. Edw. Hubert,** 3615 Melpomene St., New Orleans, La.

Living and preserved specimens.

**Living Specimens.** Price list No. 15. Southern Biological Supply Co., Natural History Bldg., New Orleans, La.

Also price lists No. 13 and No. 14 for preserved materials.

**Michigan Biological Supply Co.**, Ann Arbor, Mich.

Microscopic slides and other supplies and specimens.

**Microscopic Slides.** Price list No. 13. Also living micro-organisms. Powers and Powers, Station A, Lincoln, Nebr.

**Microscope Slides.** Catalog No. 42. Ward's Natural Science Establishment, 84 College Ave., Rochester, N. Y.

**Microscope Slides Catalog.** Supply Department, Marine Biological Laboratory, Woods Hole, Mass.

Other catalogs: "Zoölogy" and "Botany."

**Microscopic and Lantern Slides.** Conrad Supply Co., Glenn Ellyn, Ill.

**Naturalists' Supplies, Specimens.** Kny-Scheerer Corp., 10 West 25th St., New York City.

Also a separate Biological Catalog.

**Pacific Biological Laboratory,** Pacific Grove, Calif.

Living and preserved specimens. Noted for the hag-fish.

**Pioneer Aquatic Co.**, 1801 South Main St., Racine, Wisc.

Fishes, aquatic plants, aquaria and accessories, etc. Write for circular.

**A. A. Sphung,** North Judson, Ind.

Living land and fresh-water animals.

**William Bartels Co.**, 45 Cortlandt St., New York City.

Living animals—pets, fishes, snakes, birds, monkeys, etc.

**Western Biological Supply Co.**, 48th and St. Paul Ave., Lincoln, Nebr.

Living and preserved zoölogical and botanical material.

**Ziegler's Wax Models.** Kny-Scheerer Co., Department of Natural Science, 10 West 25th St., New York City.

Models, charts, prepared slides, skeletons, all types of biological materials, supplies for the laboratory. (Dr. Lagai.)

**Photomicrography.** Eastman Kodak Co., Rochester, N. Y.

An introduction to photography with the microscope, with specific instructions and illustrations of the work.

**EQUIPMENT AND SUPPLIES**

**Minerals, Fossils, and Biological Specimens.** (Add other materials in space below.)

## VI. LECTURES

The term *Lectures* as used in this section covers primarily lectures given by representatives of commercial firms. Many of the large companies maintain a division of their organization whose sole task is to present the various activities of the corporation to the public. These lectures can add a great deal of value to a science course. The lecturers are trained for their work and usually present the material in a way that is highly interesting to a high school or college class, and particularly to a science club.

The lectures are ordinarily furnished to schools without cost. In cases where lantern slides or motion pictures accompany or follow the lecture, the various companies usually provide a machine and operator, if the school is not equipped with projection apparatus.

**A List of Eugenics Lecturers.** American Eugenics Society, 185 Church St., New Haven, Conn. Free.

Arranged by states, giving address of lecturer, title of lectures, fees, etc.

**Bird Calls and other lectures.** American Nature Association, 15 Boudinot St., Princeton, N. J.

Lecture by Guy C. Caldwell, with illustrations in color.

**Rocky Mountain Wild Animals.** Extension Dept., American Nature Association, 15 Boudinot St., Princeton, N. J.

Lecture by William L. Finley, with motion pictures.

**Lecture and Motion Picture.** American Sugar Refining Co., 117 Wall St., New York City.

Lecture and motion picture covering production of sugar.

**The Borden Co., Dept. of Health Service, 350 Madison Ave., New York City.**

Lectures on nutrition, milk, and ice cream.

**The Production and Distribution of Milk for New York City.** Sheffield Farms Co., 524 West 57th St., New York City. Free.

Illustrated by a motion picture (standard non-inflammable), with operator and projecting apparatus supplied.



**Johnson and Johnson, New Brunswick, N. J.**

First aid instruction. Write for information.

**Lights and Shades.** Boys and Girls Anti-Cigarette League, 58 West Washington St., Chicago, Ill. Free.

A motion picture lecture and demonstration by Alice Hyatt Mather.

**List of Lectures on Garden Subjects.** Bulletin of the Garden Club, 604 Pine Road, Sewickley, Pa.

A directory of persons in all parts of the country who give lectures on plant life, many of whom speak with no fee but travel expense.

**Food and Health.** Kellogg Co., Battle Creek, Mich. Free.

Food and training of children and the place of cereals in meal planning.

**Lecture on Oxyacetylene Process.** Air Reduction Sales Co., 342 Madison Ave., New York City. Free.

"A lecturer and assistant put on these showings; giving a lecture, liquid oxygen demonstration, and answering questions regarding the oxyacetylene processes and their application." Probably confined to vicinity of New York.

**Linde Air Products Co., 30 East 42nd St., New York City.** Free.

Will send out lecturers to give descriptive talks on oxyacetylene process for welding.

**Mortar.** Louisville Cement Co., Louisville, Ky. Free.

This company will send out a lecturer describing the uses of mortar.

**Metric Association, 156 Fifth Ave., New York City.** Free.

Will provide lecturer on the metric system. Debate material also supplied. Prizes awarded to winning team.

**Minneapolis-Honeywell Regulator Co., 5036 Grand Central Terminal, New York City.** Free.

Will send a representative to give a demonstration and lecture on the heat regulator.

**Story of the Atom.** Chandoo N. Shah, Chemistry Laboratory, University of Chicago, Chicago, Ill. \$25.00.

This lecture, also entitled "Transmuting Mercury into Gold," is illustrated with slides of paths of atoms, with motion pictures of Brownian movement, and operation of the machine photographing the paths of atoms. A similar but more technical lecture is "Tracks of Atoms."

**A series of lectures on subjects dealing with communication.** New Jersey Bell Telephone Co. Free.

These lectures are: "The History of Communication," illustrated by 50 colored slides; "The Story of the Telephone," illustrated by 67 slides; "The Transmission of Pictures by Wire," illustrated by 40 slides; and "Transatlantic Radio Telephony," illustrated by 30 slides. Arrangements for these lectures can be made through the nearest local business office. The New York Telephone Co., 140 West St., New York City, has a similar set and it is probable the same lectures can be obtained from each of the different sectional telephone organizations.

**New York Edison Co., Bureau of Education, 393 Seventh Ave., New York City.**

This company has a lecture service for New York City only. A short talk, 10 minutes in length, can be obtained to precede the film, "At Your Service." This deals with general phases of the electrical industry. A second lecture on "The History of Electric Lighting in New York City," 20 minutes in length, is also obtainable.

They have in addition a number of very fine demonstrations limited to use in New York City. The first, "Understanding Your Electric Servants," deals with the principles of the proper control of electricity in the home, instruction in meter reading, etc. The second, "Electric Table Appliances," demonstrates the use of small appliances. The third, "The Use of Electrical Home Labor-Saving Devices," is a somewhat more general demonstration than the second. The fourth, "Lighting the Home," gives an explanation of the importance and principles of correct lighting. Nos. 1, 2, and 4 are each 30 to 45 minutes in length. No. 3 is a little over an hour in length.

**Public Utility Companies.**

The New York Edison Co. and the Public Service Co. of New Jersey have a series of lectures, demonstrations, and motion pictures on subjects connected with the use of electric appliances. Teachers living in sections of the United States other than those served by these two organizations should inquire from their local public utilities office concerning a similar service.

**Gyroscope.** The Sperry Gyroscope Co., Brooklyn, N. Y. Free.

This company will send out a lecturer who will describe the gyroscope principle. These lectures are usually provided with motion picture reels, slides, and a demonstrating gyroscope. Probably restricted to New York and vicinity.

**Rubber Growing and Manufacture.** U. S. Rubber Co., 1790 Broadway, New York City. Free.

A lecture which is occasionally supplied.

**LECTURES.** (Add other materials in space below.)

## VII. PLAYS, CLUBS, PROJECTS

Non-classroom activities in connection with science subjects have been exceedingly successful in many schools. In fact, the very words "excursion," "field trip," and the like, are frequently used as though they applied exclusively to science courses. The assembly program with some striking demonstration really dates back to the time when science (then called "natural philosophy") was struggling for recognition in the curriculum.

The following references on plays, clubs, and projects are suggestive of the wide variety of activities of this type; some, surely, will fit into the work in science in any school.

So-called "Extra-Curricular Activities" have received considerable attention recently both in books and in courses offered at universities and summer schools. Teachers who have attended such courses have received numerous suggestions applicable to plays and clubs in connection with science work in the high school. In some of the larger schools there may be scope for many special clubs—Astronomers' Club or Star-Gazers, Bird Study Group, Chemistry Club, Photographers, Radio Fans, Edison Society, or others of similar nature. One or two live groups in science, however, will be sufficient in most schools.

Dramatization of the important episodes in the history of science has seldom been used, but offers great possibilities. The amateur playwrights among pupils and teachers of science, profiting by the pioneering attempts listed in this section, may very well make the next few years fruitful, by using such dramatic situations as Pasteur's public demonstration on the farm near Melun, or his first human inoculation for rabies, or Bacon's proof of the value of refrigeration, and the like.

Since the introduction ten or fifteen years ago of the term, "Project Method," many different meanings have been read into it. Useful interpretations are given by Kilpatrick<sup>1</sup> and by Douglass.<sup>2</sup>

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<sup>1</sup>*The Project Method: The Use of the Purposeful Act in the Educative Process.* Kilpatrick, William Heard. Teachers College Bureau of Publications, 525 West 120th St., New York City. 25c.

<sup>2</sup>*Modern Methods in High School Teaching*, Chap. XI, "Project Teaching." Douglass, H. R. Houghton, Mifflin Co., Boston, Mass. 1926. \$2.25.

### A. GENERAL SUGGESTIONS

**Bibliographies on School Clubs and on Debating.** Compiled by E. K. Fretwell. Teachers College Record, June, 1927. Bureau of Publications, Teachers College, Columbia University, New York City. 35c a copy.

List of the questions to be faced in forming a club. Annotated bibliographies. Best selected list available.

**Extraclass and Intramural Activities.** A. C. Roberts and E. M. Draper. D. C. Heath and Co., 239 West 39th St., New York City. 1928. \$2.40.

This book is based on an actual study of leading high schools in all parts of the country. Chap. XVIII, "Mathematics and Science Clubs," describes various clubs and their difficulties and successes, with a discussion of underlying principles.

**For the Science Club.** A department of The Science Classroom. Popular Science Publishing Co., 250 Fourth Ave., New York City. 25c a year.

Has suggestions for programs, member activities, etc., as well as a registry for clubs.

**Junior High School Life.** Thomas-Tindal and Myers. The Macmillan Co., 60 Fifth Ave., New York City. \$2.00.

Chapter XIV gives a general discussion of the organization and guidance of school clubs; Chapter XV lists the intra-curricular activities of the school. Rich in suggestions.

**Non-Athletic Student Activities in Secondary Schools.** Q. A. Rohrback. Westbrook Publishing Co., Philadelphia, Pa. \$2.00.

Study of non-athletic activities in 134 schools. Expressions from 6,173 high school pupils about clubs. Statements from schools—"to discover where really significant things were being done." A valuable guide in the organization and administration of high school clubs.

**A Practical Method for Arousing Pupil Competition.** School Science and Mathematics. January, 1924, pp. 23-27. Mount Morris, Ill. 35c a copy.

Discusses science clubs and how to conduct them.

**Science Clubs**, in Frank, "How to Teach General Science," pp. 142-145. P. Blakiston's Sons, 1012 Walnut St., Philadelphia, Pa. \$2.00.

Discusses why clubs fail and how to make them successful.

**Extracurricular Activities**. H. C. McKown. The Macmillan Co., 60 Fifth Ave., New York City. 1928. \$3.00.

An excellent book in this field, especially Chapters VI, "Clubs"; VII, "Dramatics"; XV, "School Trips and Excursions"; and XXVI, "Miscellaneous Activities." Discussion, practicable directions, and bibliography with each chapter.

### PLAYS, CLUBS, PROJECTS

**General Suggestions.** (Add other materials in space below.)

**B. SCIENCE GAMES AND PLAYS**

**An Assembly Program: Edison.** O. E. Underhill General Science Quarterly, May, 1928, pp. 539-547. Salem, Mass. 40c a copy.

Presents the achievements of this inventor by means of dramatic dialogue.

**Assembly Programs from Class Work.** M. E. Herriott. School Science and Mathematics, 25: 150-152, 1925. Mt. Morris, Ill. 35c a copy.

Account of an interesting assembly program culminating in a "fake" radio demonstration.

**Arbo, The Game of Tree Families.** Scholastic Publishing Co., Pittsburgh, Pa. 75c.

Adapted from the old friend, "Authors." Each card has a good drawing of the leaf of a well-known American tree. Another nature game at the same price is called "Matchit."

**Arbor Day in Poetry.** H. W. Wilson Co., 963 University Ave., New York City. 60c.

Forty-seven poems of various lengths, dwelling on the Arbor Day motif.

**A Chemical Party.** Arthur T. Bawden. Journal of Chemical Education, 4:86-95, Jan., 1927. Easton, Pa. 35c a copy.

Many interesting stunts and games for a science club party, capable of being adapted in other sciences than the one in the title.

**Convincing Harold.** School Science and Mathematics, April, 1927, pp. 401-408. Mount Morris, Ill. 35c a copy.

Showing the necessity for intelligent expenditure for sewage disposal.

**Dramatics for Health.** Education Series No. 13. Superintendent of Documents, Washington, D. C. 5c.

**Dramatizing Child Health.** American Child Health Association, 370 Seventh Ave., New York City. \$3.00.

Chapters on writing, producing, dialogue, etc. Splendid bibliography. Lists of plays.

**Edward Jenner.** The Science Classroom, June, 1928, p. 1.  
250 Fourth Ave., New York City. 25c a year.

An assembly program, dramatizing his discovery of vaccination.

**Electric Questioner.** Knapp Electric Corp., Rochester, N. Y.  
Various prices.

Answers many questions on science topics Write for circular.

**Everybody's Affair.** Oleda Schrottky. Girl Scouts Headquarters, 670 Lexington Ave., New York City. 15c.

A two-act comedy with 40 characters and extras. Scene, the flowers' rendezvous, indoors or out. There is a gala day because a group of people have taken it upon themselves to make the preservation of wild flowers everybody's affair. Write for particulars on this and other plays.

**Explorer's Game.** Science News Letter, July 16, 1927. 21st and B Sts., N.W., Washington, D. C. 15c a copy.

A game devised by Girl Scouts at Camp Bonnie Brae, reported by Coordinating Council on Nature Activities.

**The Forest Fire Helper.** The Forestry Association, Washington, D. C. Free.

A masque for 5 characters and extras, poetically written, in which Fire seeks the aid of every man to destroy the forest.

**Health Hero Debates.** Metropolitan Life Insurance Co., 1 Madison Ave., New York City. Free.

Suggestions and rules for debates.

**How to Produce Amateur Plays.** B. H. Clark. Drama League Book Shop, 29 West 47th St., New York City. \$2.00.

Illustrated with excellent photographs and diagrams. Specific suggestions as to choosing the cast, rehearsing, costumes, scenery, etc., and list of plays for amateurs.

**I Grant You Three Wishes.** Samuel French Co., 25 West 45th St., New York City. 35c.

A fantasy-play for 4 to 14 characters. The story of a girl and her choice of a career.

**Lists of Plays.** The Drama League, 736 Marquette Bldg., Chicago, Ill. 25c.

Plays listed are those suitable for production by amateurs. Some have a bearing on science.



**Mechanical Jane.** Samuel French Co., 25 West 45th St., New York City. 35c. Royalty \$5.00.

A mechanical servant whose acts are so destructive that the owners decide not to wind her up again. Comedy in one act, for 3 characters.

**Old Stuff.** The Science Classroom, June, 1928, p. 8. 250 Fourth Ave., New York City. 25c a year.

A shadow picture play written around prehistoric animals.

**Plays for Girl Scouts and Their Friends.** Oleda Schrottky. Girl Scouts Headquarters, 670 Lexington Ave., New York City. Free.

Lists of plays and of books about them, with good annotations.

**A Pronouncing Chemical Formula Speller and Contest Guide.** C. A. Jacobson, Morgantown, West Va. \$4.00.

Sent on approval for purposes of examination.

**A Rainy Day in the Attic.** Science Classroom, April, 1928, p. 12. 250 Fourth Ave., New York City. 3c a copy.

Bird pictures and animal game.

**Ritual for the Adoration of a Single Flower.** Christodora House, 310 East 9th St., New York City. 30c.

A beautiful ceremony for one girl and a chorus. Appeals to the imagination.

**Rushing the Message.** General Science Quarterly, 12: 486-491, March, 1928. 40c a copy.

A graphic presentation of the means of communication, old and new.

**Save the Wild Flowers.** Circular No. 16. Wild Flower Preservation Society, 3740 Oliver St., N.W., Washington, D. C. 5c.

A one-act play for indoors or out. Characters may be small children, representing the wild flowers which are in danger of extermination.

**Sir Isaac Newton.** The Science Classroom, December, 1927, p. 12. 250 Fourth Ave., New York City. 25c a year.

Excellent historical sketch. Characters—Newton, Halley, Hooke. Theme—Controversy among scientists as to theories of light, etc.

**Science, the Servant of Humanity.** The Science Classroom, November, 1927, p. 8.

**Shows and Stunts for Fun or Funds.** E. V. Degenhardt Universal Press, 218 South Wabash Ave., Chicago, Ill. \$1.50.

Many valuable suggestions for a club committee.

**The Trial of Fire.** National Board of Fire Underwriters, 76 William St., New York City. Free.

For 18 or more characters, scene, a courtroom with eleven major causes of fire on trial. Carelessness, the chief culprit, is exiled.

**Water: Its Composition, Purity, Impurity.** The Science Classroom, May, 1927, p. 1.

### PLAYS, CLUBS, PROJECTS

**Science Games and Plays.** (Add other materials in space below.)

### C. SPECIAL CLUBS

**Activities of Chemistry Clubs.** Clarence M. Pruitt. *Journal of Chemical Education*, 4:1037-1042, August, 1927.

Splendid suggestions for plays, programs, and excursions; discusses choice of name, and the values and purposes of a chemistry club.

**Amateur Astronomers Association.** Headquarters, American Museum of Natural History, 77th St. and Central Park West, New York City. Dues \$2.00 a year. Meetings first and third Wednesdays of each month.

**Airplane Model League of America.** Secretary, Merrill Hamburg, American Building, Detroit, Mich.

This organization for boys holds national contests annually, gives instruction in the art of airplane construction, and provides plans and materials at cost to its members. It is conducted by "The American Boy" magazine.

**4-H Clubs.** Fostered by the Office of Coöperative Extension Work, U. S. Department of Agriculture, Washington, D. C.

These boys' and girls' clubs are organized in rural communities by county and home demonstration agents. The work, reaching more than half a million members, is described in *Miscellaneous Circulars* No. 77 and No. 85. Ask also for list of state directors in charge of coöperative extension work.

**How to Conduct a Radio Club.** E. E. Bucher. Marconi Publishing Co. 50c.

Suggestions on organization, types of programs, and practical demonstrations.

**How to Form a Humane Society.** Leaflet No. 37. The American S. P. C. A., 50 Madison Ave., New York City. Free.

Gives references for plays, specimen constitution, and suggested activities.

**How to Form a Nature Club.** Bulletin No. 25. The American Nature Association, 1214 Sixteenth St., N.W., Washington, D. C. Free.

Presents a good model constitution, and includes suggestions for field trips.

**Junior Audubon Club.** Special leaflet No. 22. National Association of Audubon Societies, 1974 Broadway, New York City. Free.

An announcement to teachers, giving by-laws, subjects for study, membership requirements, and list of books and supplies for Bird study.

**Junior Chapter.** Wild Flower Preservation Society, 3740 Oliver St., N.W., Washington, D. C.

Write for special suggestions in regard to forming a local chapter.

**School Nature League.** Headquarters, American Museum of Natural History, 77th St. and Central Park West, New York City.

An organization with chapters in many public and private schools. Slogan, "A nature room in every school." Specializes in distributing living nature material, and in giving assistance in arranging for flower shows, nature trips, lectures, etc.

**Woodcraft League of America.** 70 East 45th St., New York City.

An out-of-doors organization which coöperates with schools, summer camps, and similar groups. Its Council Ring, sagamores, coups, etc., perpetuate Indian lore.

**The Y. C. Lab.** Director, 8 Arlington St., Boston, Mass.

This "worldwide society for ingenious boys" is conducted by the "Youths Companion," and encourages projects of all descriptions, supplying members with plans and suggestions and awarding prizes for exceptional merit.

**Yosian Nature Walks.** J. Otis Swift, Nature Editor, New York World, Park Row, New York City.

An organization without dues, with branches in many parts of the world.

**D. INDIVIDUAL PROJECTS**

**Blue Prints.** Book Dept., Popular Science Publishing Co., 250 Fourth Ave., New York City. List free.

A number of plans of interesting things to make, prepared by the Home Workshops Dept. of "Popular Science Monthly," each blue print giving complete working drawings, bill of materials, etc., for such projects as simple furniture, ship models, radio sets, etc. 25c each.

**The Boy's Book of Experiments.** A. Frederick Collins. T. Y. Crowell and Co., 387 Fourth Ave., New York City. \$2.00.  
Many possible experiments for club members.

**Chemical Amusements and Experiments.** Charles R. Gibson. J. B. Lippincott Co., Washington Sq., Philadelphia, Pa. \$2.50.

Advice to the youthful chemist. Drawback in that its apparatus lists refer to British firms.

**Directions for Collecting Flowering Plants and Ferns.** S. F. Blake. Dept. of Agriculture, Circular No. 76. Superintendent of Documents, Washington, D. C. 5c.

Simple guide for botanical field work.

**Electrical Amusements and Experiments.** Charles R. Gibson. J. B. Lippincott Co., Washington Sq., Philadelphia, Pa. \$2.50.

Contains many directions suitable for project work.

**Electrical Toymaker.** T. O. Sloane. N. W. Henley Co., 2 West 45th St., New York City. \$1.50.

Instructions for constructing home-made electrical devices.

**Experimental Science for Technical Students.** J. W. Bispham. Oxford University Press, American Branch, 35 West 32nd St., New York City. 70c.

A laboratory manual with much useful information.

**Harper's Book for Young Naturalists.** A. Hyatt Verrill. Harper and Bros., 49 East 33rd St., New York City, 1913. \$2.00.

Guide to collecting and preparing specimens, with descriptions of the life, habits, and haunts of birds, insects, plants, etc.

**Northwestern School of Taxidermy.** 3392 Elwood Bldg., Omaha, Neb. Free catalog.

Gives correspondence courses in tanning hides, and mounting birds, mammals, and other specimens.

**How to Collect and Preserve Insects.** F. E. Lutz. Guide Leaflet No. 39. American Museum of Natural History, 77th St. and Central Park West, New York City. 10c.

Also, "The Capture and Preservation of Small Mammals for Study," "How to Mount Birds," and "The Preparation of Rough Skeletons." These are excellent directions for caring for specimens of various types, written by museum experts.

**Construction of Small Alternating Current Motors.** A. E. Watson. Popular Science Monthly, 250 Fourth Ave., New York City. \$1.50.

A book of complete instructions for building motors of several sizes. Some of their uses by amateurs are suggested.

**The Modelmaker.** W. Edmonds Spon, Editor. Spon and Chamberlain, 120 Liberty St., New York City. \$1.00.

Source for constructing projects of permanent value to a science department.

**Practical Problem Projects.** F. E. Compton Co., 58 East Washington St., Chicago, Ill. 35c.

A manual of 112 pages giving suggested problems for grades four to nine inclusive, with illustrations and references to Compton's Pictured Encyclopedia.

**Scale Models.** Boucher, Inc., 415 Madison Ave., New York City. Catalog 25c.

Much valuable information concerning models of ships, steam engines, turbine generators, locomotives, etc., such as, history of steam engines, hints on sharpening tools, on painting and finishing, on sailing model yachts, etc., is included in this catalog of models and accessories used in their construction

**Things to Make.** Archibald Williams. Thomas Nelson and Sons, 381 Fourth Ave., New York City. \$2.00.

Directions for many kinds of projects are given in detail.

**Work Book in General Science.** E. C. and K. M. Persing. Harter School Supply Co., 2046 East 71st St., Cleveland, Ohio. 60c.

Although intended for a class laboratory manual, this 128-page notebook contains many suggestions for some experiments and individual projects.

**The Young Collector.** Wheeler McMillen. D. Appleton and Co., 35 West 32nd St., New York City. \$1.75.

A good guide whereby youthful energy may be used to make collections that mean something because they are well classified. Includes suggestions to parents and teachers, specific directions as to a dozen or so collections for both very young and older boys and girls, and hints concerning scrapbooks, and small museums, and on inventing an individualistic hobby. Illustrated with line drawings.

**Bio-Set.** New York Biological Supply Co., 34 Union Sq., New York City.

A set of materials for studying living things, including a small but practical microscope. These and "Bio-Kits" are similar in plan to Chemcraft sets, etc. Write for descriptive leaflets.

**Chemcraft Sets.** Porter Chemical Co., Hagerstown, Md.

Various sets of materials for amateur experiments with chemicals. Write for descriptive booklet.

**Erector and Chemistry Sets.** A. C. Gilbert and Co., New Haven, Conn.

Valuable project material for science popularization. Write for Catalog. "Manual of Toy Sets," 50c.

**Gem Science Set.** Bausch and Lomb Optical Co., Rochester, N. Y.

A case containing instruments and materials for the amateur microscopist to make slides, including a small microscope. Send for descriptive leaflet.

**Meccano Sets.** Meccano Co., 200 Fifth Ave., New York City.

Useful for constructing laboratory models, etc. Send for catalog.

**PLAYS, CLUBS, PROJECTS**

**Clubs and Individual Projects.** (Add other materials in space below.)



### VIII. EXCURSIONS

is undoubtedly true that the making of excursions or field is, in many schools, a little known art. The biology es have, quite generally, ventured forth, but for most of ther science classes a trip for observing some application ytical or chemical laws is unknown.

e plant to be visited may be at some distance from the ol, but in these days of rapid transportation this circum-e should not present a very great problem. In many nunities it will be found that members of the class can de automobiles enough for the whole group. If this is he case and if double laboratory periods which would time for the trip are not available, then the only possi-is for after school hours, Saturday, or a holiday. The tion may be raised that teachers will not give up so of their spare time, or that pupils will not want to use out-of-school time for an excursion. If the former is the there is nothing that this article can do; it is to be hoped heir attitude will change. As for the latter, it is not gen-r true. In one school, on the first day of a long-awaited r vacation, sixty-five members of a physics group of one red pupils journeyed twenty miles to go through the on Lighting Institute, devoting the greater part of a day e trip. Other schools report a similar interest in ex-ons.

is quite generally agreed that the teacher should visit the tive of the trip first. While there, he should note the rtant points to be observed. Before making the visit, the should be prepared for the excursion by discussion, as-d readings, or other means that will focus their interest e objectives discovered by the teacher's preliminary visit. main points to be noted should be given to the class, pref-y in mimeographed form. At the first meeting of the following the excursion, there should be a discussion of xperiences of the trip, followed by a test on the points asized.

general, excursions should be primarily a student activity should be guided by the teacher only when special condi-make such guidance necessary.

### A. PURPOSE AND VALUE

**The Excursion as a Means of Education.** Thomas H. Briggs. Teachers College Record, November, 1921. Bureau of Publications, Teachers College, Columbia University, New York City. 35c a copy.

Discusses the educational worth of the excursion as a school activity. Reports a series of excursions conducted by the Speyer Experimental Junior High School of Teachers College. Outlines the program of a typical excursion: preparation for the trip, the excursion, use made of experiences, etc.

**Extra-Curricular Activities.** H. C. McKown. The Macmillan Co., 60 Fifth Ave., New York City. \$3.00.

Chapter on "Trips and Excursions" is especially helpful.

**Field Work.** Charles W. Finley and James S. Tippet. Bureau of Publications, Teachers College, Columbia University, New York City. 75c.

Records of the field work conducted by Lincoln School. Excellent specific directions for such activities. Illustrated.

**Field Work and Its Value.** George W. Hunter. Teachers' Manual for New Civic Biology, p. 24. American Book Co., 80 Lexington Ave., New York City. Free to teachers who use the text; to others, 60c.

Stresses need for first-hand experience.

**Field Observation.** G. R. Twiss. In "Principles of Science Teaching," pp. 143-149, 250-253. The Macmillan Co., 60 Fifth Ave., New York City. \$2.00.

Discusses obstacles to field work and how to overcome them; gives suggestions on how to conduct excursions, especially as to the right attitude of the pupils.

**Problem Solving Applied to Field Work in Biology.** Walter P. Porter. School Science and Mathematics, 26:278-282, Mar., 1926. Mt. Morris, Ill. 35c a copy.

Workable plans for organizing trips around problems, with suggestions as to outlines before, procedure during, and checking up after, the excursion.

**Some Suggestions for Bird Field Trips.** Bureau of Biological Survey, Washington, D. C. Free.

A one-page leaflet with practical suggestions as to equipment.

**Vacation Activities and the School.** Lincoln School Faculty. Bureau of Publications, Teachers College, Columbia University, New York City. 65c.

Describes the ways that one school links the activities of the vacation time with those of the school year. Prepared by the Lincoln School.

**PURPOSE AND VALUE OF EXCURSIONS.** (Add other suggestions in space below.)

## B. VISITS TO INDUSTRIAL PLANTS

A list of firms allowing groups to make trips through their factories, may seem impractical in a publication intended for general distribution throughout the country. This list, however, is given, not as a directory from which a teacher may select a plant for a group to visit, but rather as a sampling of representative firms throughout the country, to show to what extent companies of all kinds will coöperate in offering this courtesy to teachers. It is a rare company indeed that will refuse permission for a class to go through its factory, and a little inquiry in one's own community will result in a list of considerable length. Possible industries represented on such a list would be: the artificial ice plant; the gas plant; telephone exchange; the local power plant or transformer station; the water supply system; the board of health; and others which are represented in practically all communities. To these could be added also those industries peculiar to the locality: the coal mine, the steel plant, the agricultural experiment station, and a long list of organizations whose products or processes illustrate science in the service of the world.

### **The Aeolian Co., 689 Fifth Ave., New York City**

Arrangements can be made by writing to the above address for a trip through the factory where pneumatic player pianos are made. Guides are provided.

### **Excursion to Cement Plant. Alpha Portland Cement Co., 13 South St., Easton, Pa., or 165 West Wacker Drive, Chicago, Ill.**

This company will provide guides for trips of inspection.

### **American Electrical Heater Co., Detroit, Mich.**

This factory manufactures flat irons, soldering irons, etc.

### **American LaFrance and Foamite Corporation, Utica, N. Y.**

This company allows groups to go through its factory, where fire extinguishers are made.

### **Anaconda Copper Mining Co., Butte, Mont.**

Copper mining and refining.

### **Armstrong Cork Co., Lancaster, Pa.**

Interesting to chemistry students. Guides are provided.

**Bell Telephone Laboratories, 463 West St., New York City.**

A trip through this institution would be most valuable. The company is inclined, however, to limit permits to teachers of physics and chemistry, and to a few seniors who might become student assistants in the laboratories upon graduation. There is, however, a museum containing much of historic interest along telephonic lines. Admission to this museum is easily obtained.

**Berry Brothers, 211 Leib St., Detroit, Mich.**

Will allow visitors to go through their factory where they make varnishes, enamels, etc. Guides are provided. A fine trip.

**The Borden Co., 350 Madison Ave., New York City.**

Write for arrangements; trips to bottling plant, condensery, etc.; guides are provided.

**Brown Instrument Co., Philadelphia, Pa.**

This company makes a high grade of recording instruments and will allow groups to go through their plant. Guides are provided.

**The Buffalo Foundry and Machine Co., Buffalo, N. Y.**

Will allow groups to go through their factory where they make dryers and evaporators. Guides are provided.

**The Calumet Baking Powder Co., 4100 Fillmore St., Chicago, Ill.**

They will conduct groups of visitors through their factory. Guides are provided. Trip of value to chemistry students.

**The Carborundum Co., Niagara Falls, N. Y.**

Allows visitors to go through their factory. Guides are provided. A very interesting trip for students.

**Carter's Ink Co., Boston, Mass.**

A trip to this factory would be interesting to chemistry students. Guides are provided.

**The Celotex Co., 645 North Michigan Ave., Chicago, Ill.**

A trip through this company's plant at New Orleans, La., would be of value.

**The Central Alloy Steel Corporation, Massillon, Ohio.**

Allows visitors to go through factory. Guides are provided. This should be a valuable trip.

**Chocolate Sales Corporation, Hershey, Pa.**

Visit to factory of chocolate and cocoa products. Guides are provided.

**Colgate and Co., 105 Hudson St., Jersey City, N. J.**

Special arrangements must be made in advance. Guides are provided.

**Copeland Co., 630 Lycaete Ave., Detroit, Mich.**

Will conduct groups through factory. Guides are provided.

**De LaVergne Machine Co., 910 East 138th St., New York City.**

This company will allow groups to go through their factory and will provide guides. They manufacture oil engines and refrigerating machinery.

**Diamond Crystal Salt Co., St. Claire, Mich.**

This company invites visitors to go through the plant, guides being provided.

**Edison Lighting Institute, Harrison, N. J.**

The General Electric Co. has spent many thousands of dollars in remodeling a factory to present the complete story of light. Groups from all over the eastern portion of the country come to visit this institute. High school groups are invited. This trip is one of very great value. If desired the group may observe the process of manufacture of incandescent lamps.

**Edison Storage Battery Co., Orange, N. J.**

A trip through this factory would be of value. Guides are provided.

**Food Preservation Show. Domestic Electric Co., 39 West 45th St., New York City.**

This company's food preservation show is run continuously in some one of the cities of the territory it covers. Contains much of interest to science students in that it shows the growth of bacteria in milk and other foods, and the way in which electric refrigeration checks this growth. Has also a display of refrigeration methods from the prehistoric cave to the present time.

**French Battery Co., Madison, Wisc.**

Permits trip to their plant where dry batteries are made. Guides are provided.

**General Electric Co., 1 River Road, Schenectady, N. Y.**

This is a most valuable trip. Guides are provided. For groups near enough to Schenectady this would be an excellent excursion.

**Gold Medal Flour Mills, Minneapolis, Minn.**

Visit this huge flour mill. Guides are provided.

**Gould Manufacturing Co., 16 Murray St., New York City.**

Allows trips; provides guides. Valuable for study of pump manufacture.

**H. J. Heinz Co., Pittsburgh, Pa.**

Many plants where foods are preserved and canned. Guides are provided.

**Jewell Electrical Instrument Co., 1640 Walnut St., Chicago, Ill.**

This company manufactures electrical measuring instruments. A trip through its factory would be well worthwhile, even if a considerable journey was necessary.

**The Kellogg Co., Battle Creek, Mich.**

Where breakfast cereals are prepared. Guides are provided.

**Kimble Glass Co., Vineland, N. J.**

This company allows groups to go through their factory and provides competent guides.

**Kirkman and Son, Brooklyn, N. Y.**

This company, manufacturers of soaps, will allow students to go through their factory. Guides are provided.

**Louisville Cement Co., Louisville, Ky.**

A trip through this factory will show the process and manufacture of cement. Guides are provided.

**National Lead Co., 111 Broadway, New York City.**

This company allows groups of students to go through their factory. Guides are provided.

**New York Edison Co., Bureau of Education, 393 Seventh Ave., New York City.**

This company will allow groups of students to go through some of its various plants for producing electricity. Guides are provided.

**Okonite-Callender Cable Co., Passaic, N. J.**

This company makes electrical cables, wires, etc. Guides are provided.

**Pasteurizing Plant. Borden Farm Products Co., 110 Hudson St., New York City.**

Visits can be arranged for any morning, including Saturday.

**Pelton Water Wheel Co., Richmond and Morris Streets, Philadelphia, Pa.**

This company makes a well-known type of water wheel. A trip through its plant would be of great value. Guides are provided.

**Pittsburgh Testing Laboratories, Pittsburgh, Pa.**

A trip through the laboratories of this company would be most interesting as illustrating modern testing practice. Guides are provided.

**Rice Products, Inc., 100 East 42nd St., New York City.**

This company manufactures electric refrigerators. Groups are invited and guides are provided.

**Sangamo Electric Co., Springfield, Ill.**

For students within reasonable distance of this company a trip to their factory would be of great value. They manufacture meters of all kinds.

**Sheffield Farms Co., 524 West 57th St., New York City.**

Visit to pasteurizing and bottling plants. Guides accompany the group.

**Strathmore Paper Co., Mittineague, Mass.**

A trip to this company's factory will bring out clearly the process of paper making. Guides are provided.

**Timken Roller Bearing Co., Canton, Ohio.**

This company allows groups to go through plant and provides guides.

**Transportation Exposition. Grand Central Terminal, New York City. Admission free.**

Consists of models and paintings of early forerunners of the modern locomotive, as well as the original complete train that made the first run from Albany to Schenectady, Aug. 9, 1831, drawn by the locomotive "De Witt Clinton."



**The U. S. Gypsum Co., 300 West Adams St., Chicago, Ill.**

This company has mines and mills in various parts of the United States. Visitors are allowed in any one of them. Write the main office to find the location of the plant nearest you.

**U. S. Industrial Alcohol Co., 110 East 42nd St., New York City.**

Arrangements can be made at above address to go through factory. Guides are provided.

**Universal Portland Cement Co., 210 South LaSalle St., Chicago, Ill.**

This company has plants in many parts of the United States. Visitors are always welcome.

**Wagner Electric Corporation, 6400 Plymouth Ave., St. Louis, Mo.**

By special arrangement permission for a trip through this factory, where motors of all kinds are made, can be secured. Guides are provided.

**L. E. Waterman Co., 191 Broadway, New York City.**

Trips through the factory, with guides, can be arranged. Uses of rubber and gold are shown.

**Westinghouse Electric and Mfg. Co., East Pittsburgh, Pa.**

A trip through the chemistry laboratories may be arranged.

**Westinghouse Union Battery Co., Swissvale, Pa.**

Inspection trips allowed; guides are provided.

**Worcester Salt Co., 71 Murray St., New York City.**

A trip through a near-by establishment of this company may be arranged through the above address or the local division. Guides are provided.

**Western Electric Co., 195 Broadway, New York City.**

A trip through the factory which makes Graybar materials can be arranged at above address. Guides are provided.

**Wright Aeronautical Corporation, Paterson, N. J.**

Guides are provided for a trip through this interesting factory, where the Whirlwind engine is made.

**VISITS TO INDUSTRIAL PLANTS.** (Add other materials  
in space below.)

## C. MUSEUMS

### Coöperation with Schools

**The Children's Museum and the Schools.** The Children's Museum, Brooklyn, N. Y. Free.

A leaflet describing the loan exhibits, lectures, docent service, and other activities for school children.

**Creative Education in School, College, University, and Museum.** Henry Fairfield Osborn. Chas. Scribner's Sons, 597 Fifth Ave., New York City. 360 pp. 1927. \$2.50.

"Special emphasis on scientific exploration and discovery, and the museum as a force in education."—H. A. Webb.

**Manual for Small Museums.** L. V. Coleman. G. P. Putnam's Sons, or American Association of Museums, 2 West 46th St., New York City. 395 pp. \$5.00.

Detailed discussion on the building of a museum from simple beginnings; how to file pictures and other materials, activities for children, school service, lending sets, etc.

**Museum in Relationship to Schools.** L. V. Coleman. *School Life*, IX:7, March, 1924. Bureau of Education, Washington, D. C. 50c a year; 5c a copy.

An excellent review of the coöperation between schools and museums.

**Visual Education Through Things in Museums.** Harold L. Madison, Curator of Education, Cleveland Museum of Natural History. In "Visual Education Handbook," Vol. III, 1926. Visual Instruction Association, 71 West 23rd St., New York City. Annual for members; dues \$2.00 a year.

Gives an outline of instruction and describes a museum game. In the same issue is an article on the schoolroom museum, "Use of Realia in Teaching."

**Educational Work of the Commercial Museum of Philadelphia.** Bulletin, 1920, No. 13. Bureau of Education. Superintendent of Documents, Washington, D. C. 15c.

Working models of great inventions, which are exhibited in this museum, are described in this bulletin.

**Nature Trails.** Frank E. Lutz. Miscellaneous Publication No. 21; **Signs Along the Trail.** Wm. A. Carr. School Service Series, No. 2. Department of Public Education, American Museum of Natural History, 77th Street and Central Park West, New York City. 10c each.

Describe the nature trails in Palisades Interstate Park near Bear Mountain, New York.

**Prospectus of Courses and Lectures.** Department of Public Instruction, Brooklyn Botanic Garden, Brooklyn, N. Y. Annual. Free.

Many types of coöperation with schools described. Also leaflets, "How Bacteria Are Studied in High School Science Classes," "Story of Plant Evolution," and others.

**Schools and the Newark Museum.** Newark Museum, Washington Place, Newark, N. J. 5c.

A description of some splendid cooperation between museum and schools. Other booklets are "Educational Material for Teachers," "A Museum of Service," and "Nothing Takes the Place of Leather." 25c.

**The Story of the Museum's Service to the Schools.** George H. Sherwood, Curator of Department of Public Education, American Museum of Natural History, 77th St., and Central Park West, New York City. Free to teachers.

Mostly illustrations of exhibits. Other booklets available, "Guide to School Service Building," "Assistance for Teachers," "Visual Aids in Nature Study," etc.

**Suggestive School Trips to the American Museum of Natural History,** 77th St., and Central Park West, New York City. School Service Series, Leaflet No. 2. Free to teachers.

Arranged by grades through junior high school.

**Visual Aids of the St. Louis Museum.** Bulletin, 1924, No. 39. Bureau of Education. Superintendent of Documents, Washington, D. C. 10c.

A description of the exhibits contained in and distributed by this museum forms the basis for a general discussion of the use of visual aids.

### Representative Museums

The list of museums given under this head is by no means complete. More extensive lists may be found in the following five references.

#### DIRECTORIES

**Directory of American Museums.** American Association of Museums, 2 West 46th St., New York City. \$5.00.

An exhaustive directory of the museums of Canada, the United States, and Central and South America.

**Directory of Natural History Museums in the United States and Canada.** F. J. H. Merrill. Miscellaneous No. 62. New York State Museum, Albany, N. Y. 30c.

An extensive directory.

**List of Science Museums.** In "Nature Almanac," pp. 73-83. American Nature Association, Washington, D. C. \$1.00.

A very complete list for this country, arranged by states.

**European Museums.** European Travel Number, of "Science News-Letter," No. 365, April 7, 1928. 21st and B Sts., N. W., Washington, D. C. 15c a copy.

This issue includes much valuable information for the science student concerning points of interest in Europe.

**Museums in America.** American Travel Number, of "Science News-Letter," No. 366, April 14, 1928. 21st and B Sts., N. W., Washington, D. C. 15c a copy.

Lists of museums, zoölogical and botanical gardens, national parks, etc.

#### MUSEUMS

**American Museum of Natural History,** 77th St. and Central Park West, New York City.

**American Museum of Safety,** 124 East 28th St., New York City.

**Boston Museum of Natural History,** Boston, Mass.

**Buffalo Museum of Natural Sciences,** Buffalo, N. Y.

**Children's Museum,** Brooklyn, N. Y.

**Museum of the American Indian**, Heye Foundation, Broadway at 155th St., New York City.

**Museum of Peaceful Arts**, 24 West 40th St., New York City.

*Working models of many well-known inventions, etc.*

**The New National Museum**. Washington, D. C.

**Staten Island Museum**, New York City.

**Charleston Museum**, Charleston, S. C.

**Field Museum of Natural History**, Chicago, Ill.

**Denver Museum**, Denver, Colo.

**Rochester Museum**, Rochester, N. Y.

**San Diego Natural History Museum**, San Diego, Calif.

**Santa Barbara Museum of Natural History**, Santa Barbara, Calif.

**Southwestern Museum**, Los Angeles, Calif.

**The Valentine Museum**. 1015 East Clay St., Richmond, Va.

**Willie Museum**, San Antonio, Texas.

**Yosemite Museum**, Calif.

**MUSEUMS.** (Add other materials in space below.)

## IX. CAREER-PLANNING FOR SCIENCE STUDENTS

No other subject opens up avenues of approach to so many trades and professions as does science. Outstanding examples are, of course, medicine, agriculture, and engineering, with their many subdivisions; the mechanical trades, etc. In fact, it would be difficult to show that there is any occupation which has no ramifications in science.

The present age of specialization requires a wise method of directing young life into channels where the special aptitude of the individual can be made of most worth to society. Rare indeed is the teacher who has not been approached with the life-work problem of some pupil. Perhaps in one of the succeeding references is the answer for which that pupil is waiting.

As Lorado Taft asks, "Can there be any higher joy on earth than the discovery and encouragement of talent?" (Christian Century, 440 South Dearborn Ave., Chicago, Ill., June 7, 1928, p. 727.)

### A. GENERAL VOCATIONAL GUIDANCE

**Personnel Studies of Scientists in the United States.** By Ching-Ju Ho. Contributions to Education, No. 298. Teachers College, Columbia University, New York City. 1928. \$1.50.

A study of the preparation of American scientists, with their present positions, and the opportunities in similar fields.

**Career Planning.** Bentley School of Accounting, 921 Boylston St., Boston, Mass. Free.

Lists of trades and vocations. Good general suggestions, though primarily for business students.

**News Bulletin.** The Bureau of Vocational Information, Room 1610, 51 East 42nd St., New York City. \$1.00 a year.

A periodical published twice a month, except July and August. Lists opportunities in various fields, describes vocational guidance programs in individual schools, etc. Includes references to magazine articles and bibliographies of books on vocational subjects.



**Occupations.** Gowin, Wheatley, and Brewer. Ginn and Co., 70 Fifth Ave., New York City. 1923. \$1.48.

A book of practical information on a wide range of subjects. Excellent for high school use.

**An Outline of Careers.** E. L. Bernays. Geo. H. Doran Co., New York City. 1927. \$5.00.

Subtitle—"A practical guide to achievement." Brief sketches of the lives of thirty-eight successful Americans in many fields of endeavor, a number of which are in science.

**Vocational Education Magazine.** J. B. Lippincott Co., Philadelphia, Pa. \$3.00 per year.

Monthly. The organ of the National Society for Vocational Guidance.

**The Vocational Guidance of College Students.** Studies in Education VIII. Harvard University Press, Cambridge, Mass. \$2.50.

The author points out that the purpose of vocational guidance is to help open up possibilities in various fields, and to direct the student into the kind of work congenial to the individual and serviceable to the community. This press also publishes "A Guide to the Study of Occupations," which contains an outline and a bibliography for each common occupation. By F. J. Allen. \$2.50.

### For the Pupil

**The Book of Opportunities.** Edited by R. H. Platt, Jr. G. P. Putnam's Sons, 2 West 45th St., New York City. 1927. \$3.00.

An indispensable reference book in this field. Announced as including 3,000 occupations.

**Choosing Your Life Work.** Wm. Rosengarten. McGraw-Hill Book Co., 370 Seventh Ave., New York City. \$2.50.

Written especially for high school pupils. Gives helpful suggestions to assist in the making of this important choice.

**Careers.** E. G. Rodger. D. Appleton and Co., 35 West 32nd St., New York City. 1928. \$1.50.

Very readable, especially for boys. Describes the characteristic features of many careers.

**Girls Who Did.** Helen Ferris and Virginia Moore. E. P. Dutton and Co., 681 Fifth Ave., New York City. 1927. \$2.50.

Subtitle—"Stories of real girls and their careers." Very practical and interestingly narrated.

**What Are You Going to Be?** Hallam Hawksworth. The Century Co., 353 Fourth Ave., New York City. 1924. \$1.75.

A book of little talks on various vocations for young people. Also, "The Workshop of the Mind," \$1.60.

**What Shall I Be?** C. H. Ernst. D. Appleton and Co., 35 West 32nd St., New York City. 1924. \$1.50.

Each chapter is written by a leader in a particular field—chemistry, farming, etc.

**The Vocation Guide-Book.** The Education Syndicate, 230 West 17th St., New York City. 25c. Discount on quantities.

A booklet of explicit information for the student on many lines of work, the necessary training for them, opportunities, etc., with brief bibliography.

**Training for the Professions and Allied Occupations.** Bureau of Vocational Information, Room 1610, 51 East 42nd St., New York City. \$3.70.

A very compendious reference work, outlining especially lines of endeavor open to women.

**Bibliography of Vocational Guidance.** Bulletin No. 66. Trade and Industrial Series No. 19. Federal Board for Vocational Education, Washington, D. C. Free.

An extensive list classified by topics in this field.

**Vocational Information Prepared by the Committee on Vocational Guidance.** Leland Stanford University, Palo Alto, Calif. 1923. 25c.

Discusses seventeen groups of occupations, with subdivisions of each. Describes the nature of the work, training, opportunities, salaries, etc. Very useful publication.

**Vocational Self-Guidance.** Douglas Fryer and Others. J. B. Lippincott Co., Philadelphia, Pa. 1925. \$3.00.

"Planning your life-work after self-analysis, and a study of 21 important occupations, many scientific."

**What Girls Can Do.** Ruth Wanger. Henry Holt and Co., 1 Park Ave., New York City. 1926. \$1.28.

Includes an excellent section on the professions that have to do with health; also a chapter on women in agriculture.

**The Wiley Vocational News.** John Wiley and Sons, 440 Fourth Ave., New York City. Free.

Describes Wiley books on vocational subjects. A good bibliography on agriculture, chemistry, etc.

**GENERAL VOCATIONAL GUIDANCE.** (Add other materials in space below.)

## B. SPECIAL CAREERS IN SCIENCE

**Merit Badge Series.** Boy Scouts of America, 2 Park Ave., New York City. 20c each (except "Insect Life," \$1.50).

Titles: Agriculture, Astronomy, Aviation, Bee Keeping, Bird Study, Botany, Chemistry, Conservation, Dairying, Electricity, First Aid, First Aid to Animals, Forestry, Insect Life, Mining, Photography, Poultry Keeping, Public Health, Radio, Surveying, Taxidermy, Textiles, and others.

Each contains a biographical sketch of an outstanding leader in the designated field, and offers suggestions as to qualifications, difficulties, and benefits for one who is considering it as a life work.

**Studies of Occupations in Agriculture, Forestry, and Animal Industry.** F. J. Allen. Harvard University Press, Cambridge, Mass. 1921. \$2.50.

Chiefly an extensive bibliography. Also "A Guide to the Study of Occupations." 1925. \$2.50.

### Chemistry

**Profession of Chemistry.** R. B. Pilcher. D. Van Nostrand Co., New York City. 1919. \$2.00.

**Opportunities in Chemistry.** E. Hendrick. Harper and Bros., New York City. 1919. \$1.25.

**The Earning Power of Chemistry.** Arthur D. Little. Chemical Foundation, 85 Beaver St., New York City. Free.

Reprint from *Journal of Industrial and Engineering Chemistry*, Vol. 3, No. 8, Aug., 1911.

**Women in Chemistry.** Bureau of Vocational Information, Room 1610, 51 East 42nd St., New York City. 60c.

A study of professional opportunities. Information on types of positions and methods of securing them, training and personal qualities necessary for success, duties, salary ranges, etc.

### Electricity

**Training for the Electric Railway Business.** C. B. Fairchild. J. B. Lippincott and Co., Philadelphia, Pa. 1919. \$1.75.

**How to Become a Successful Electrician.** T. O. Sloane. N. W. Henley Co., New York City. 1913. \$1.50.

### Engineering

**The Engineer.** J. H. Hammond. Chas. Scribner's Sons, 597 Fifth Ave., New York City. 1924. \$1.25.

**Young Man and Civil Engineering.** G. F. Swain. The Macmillan Co., 66 Fifth Ave., New York City. 1922. \$3.00.

**Engineering as a Life Work.** J. V. Lynn and E. S. Baird, Iowa State College, Engineering Extension Department, Ames, Iowa. 25c.

Developed especially for use of vocational counselors in high schools.

**The Engineer: His Work and His Education.** R. L. Sackett. Ginn and Co., 70 Fifth Ave., New York City. \$1.40.

"This little book is just the thing to put into the hands of the young men who want to know what engineering is, what are the distinctions between its various branches, how does it pay, and how should one go about getting into it." Science News-Letter.

### Forestry

**Training of a Forester.** G. Pinchot. J. B. Lippincott and Co., Philadelphia, Pa. 1917. \$1.75.

**Profession of Forestry.** U. S. Forestry Service, Washington, D. C. Superintendent of Documents, Washington, D. C. 5c.

**Forestry as a Profession.** E. A. Sherman. U. S. Forest Service. Superintendent of Documents, Washington, D. C. 5c.

### Medicine

**Training and Rewards of the Physician.** R. C. Cabot. J. B. Lippincott and Co., Philadelphia, Pa. 1918. \$1.75.

**The Physician.** J. M. T. Finney. Chas. Scribner's Sons, 597 Fifth Ave., New York City. 1923. \$1.25.

### General

**Career Bulletins.** National Research Council, Washington, D. C. Free to teachers.

Titles are:

"Agriculture Research," E. D. Ball.

- "Anthropology," Clark Wissler.
- "Astronomy," P. W. Merrill.
- "Botanical Research," John M. Coulter.
- "The Field for Chemists," Wilder D. Bancroft.
- "Forestry," H. S. Graves.
- "Geology," J. F. Kemp.
- "Public Health Research," D. L. Edsall.
- "Industrial Research," John Mills.
- "Mathematics," C. J. Keyser.
- "Medical Research," F. P. Gay.
- "Physics," Geo. W. Stewart.
- "Psychology," C. E. Seashore, Editor.
- "Zoological Research," C. E. McClung.

These bulletins, although primarily intended for students in colleges and universities, would be valuable additions to the science section of the high school library, for use by the brightest and most ambitious students.

**Careers in Public Health Service.** J. A. Ferrell. Rockefeller Foundation, 61 Broadway, New York City. Free.

Clearly defines the field; gives detailed statistical tables and bibliography. Annual report of the Foundation sent on request.

**Training of Dental Hygienists.** School Health Studies, No. 9, U. S. Bureau of Education. Superintendent of Documents, Washington, D. C. 5c.

Other publications are: "Opportunities for the Study of Engineering at American Higher Institutions," 5c; "Opportunities for Study of Medicine in the United States," 5c.

**Opportunities for a Life Career in the Field of Public Health.** Public Health Service, Washington, D. C. 1925. 62 pp. Free.

"Prepared under the direction of the Advisory Committee to Surgeon General on the Education of Sanitarians and the Future of Public Health in the United States." Also, "The United States Public Health Service as a Career," by W. C. Rusher.

### C. LEARN-WHILE-YOU-EARN SCHEMES

**Allis-Chalmers Manufacturing Co., Milwaukee, Wisc.** Free.

"Prospectus of Apprenticeship System," a 32-page publication describing a system of apprenticeship for non-college trained men.

"Graduate Student Course," a 22-page pamphlet describing the course for graduate engineers.

**American Telephone and Telegraph Co.,** 195 Broadway, New York City. Free.

"Work and Opportunity in the Bell System," a pamphlet describing the nature of the work.

**General Electric Co.,** Schenectady, N. Y., or any branch office. Free.

"Opportunities for Engineering Graduates." One of four booklets outlining continued training while in service in this organization.

**Ingersoll-Rand Co.,** 11 Broadway, New York City. Free.

This company issues a catalog describing their scheme for training graduate engineers.

**New York Stock Exchange,** New York City. Free.

"Report of the Personnel Department." Contains many valuable suggestions for anyone interested in vocational guidance.

**Westinghouse Electric and Manufacturing Co.,** East Pittsburgh, Pa. Free.

Described in booklet, "Intermediate Training Course." For graduates of a four-year high school. Students under this plan work a 48-hour week and attend a company-maintained night school three nights weekly.

**Standard Oil Co.,** Personnel and Training Dept., 26 Broadway, New York City. Free.

"Opportunities for Junior Office Work." A leaflet describing a training course given during preliminary employment.

**CAREER PLANNING IN SCIENCE FIELDS.** (Add other materials in space below.)



## X. SUMMER ACTIVITIES FOR SCIENCE TEACHERS

Now that scores of teacher-training institutions are conducting summer schools, attended by increasing thousands of teachers in service, is there special professional opportunity for science teachers in these institutions and elsewhere? So far as the compilers of this bulletin can learn, the following list is the first attempt to answer this question with extensive, specific information. Special assistance in compiling this list was rendered by Miss Callie Hull of the National Research Council.

The general arrangement within a subdivision is geographical. The dates for 1928 are given, since approximately the same period is included each year. Very few summer sessions on the regular campus are listed. The institution under whose auspices a field course is given is named in parentheses.

### A. LISTS OF COURSES

**Opportunities in Summer Schools.** Adele Humphrey. *Journal of the National Education Association*, Vol 17:155-159, May 1928. 1201 Sixteenth St., N. W., Washington, D. C. 25c a copy.

A very comprehensive list arranged by states.

**Science Courses in Summer Schools.** *General Science Quarterly*, May 1928, p. 563. Salem, Mass. 40c a copy.

A directory of certain typical courses for teachers of science in various parts of the country. A similar list appeared in the same journal, May 1925.

**Visual Instruction in the Summer Schools of 1928.** Keystone View Co., Meadville, Pa. Free.

An itemized list of courses bearing on this topic, arranged by states. This leaflet is probably issued annually.

**B. SPECIAL SUMMER SCHOOL BULLETINS****Courses for Teachers and Supervisors of Natural Sciences.**

Teachers College, Columbia University, 525 West 120th St., New York City. July 9-August 17, 1928.

**Courses for Teachers.** Summer School 1928. Massachusetts Institute of Technology, Cambridge, Mass.

**Electricity and Household Electrical Equipment.** An announcement of a course at Teachers College, 525 West 120th St., New York City. Second year. In coöperation with the National Electric Light Association, 420 Lexington Ave., New York City. C. J. Lynde, Director. July 30-August 17, 1928.

**Summer Courses.** Case School of Applied Science, Cleveland, Ohio. Charles Sumner Howe, President. July 2-August 10, 1928.

**Know-Kentucky Courses in Biology and Geography.** Western Kentucky State Normal School and Teachers College, Bowling Green, Ky.

**A Summer of Study in Science.** Special Catalog of The Utah Agricultural College, Logan, Utah. June 18-July 27, 1928.

**Sierra Summer School (of Fresno State College).** Huntington Lake, Calif. W. B. Givens, Dean. June 25-August 3, 1928.

**SPECIAL SUMMER SCHOOL BULLETINS.** (Add other materials in space below.)

### C. SUMMER CAMPS AND NATURE SCHOOLS

**Camp Directors Association.** Laura I. Mattoon, Secretary, Wolfeboro, N. H.

**Handbook of Summer Camps.** An annual complete directory. Porter Sargent, 11 Beacon St., Boston, Mass. 800 pp. 8 maps. \$5.00.

**Ninth Camp Leadership Course.** Teachers College, Columbia University, 525 West 120th St., New York City. E. K. Fretwell, Director. Eight Monday evening meetings, March 5-April 30, 1928.

**Camp Craft Conference.** (Camp Directors Association). Camp Allegro, Silver Lake, N. H. Albert S. Pulling, Director. Sixth year. June 19-26, 1928.

**Summer Camp of the Physical Education Department** (of New York University) on Sebago Lake, Sloatsburg, N. Y. Jay B. Nash, Director. July 9-August 17, 1928.

**The Nature Lore School** (Coordinating Council on Nature Activities). Camp Andree, Briarcliff Manor, New York. Bertha Chapman Cady, Executive Secretary. Ninth year. June 16-30, 1928.

**Nature Camps** (Pennsylvania State College). Alan Seeger Ranger Station, in Stone Valley, Pa. George R. Green, Director. Camp No. 1, June 28-July 18. Camp No. 2, July 18-August 7, 1928.

**Nature Guide School.** (Senior Teachers College of Western Reserve University and Cleveland School of Education). Hudson, Ohio. William G. ("Cap'n Bill") Vinal, Director. June 16-July 28, 1928.

**Allegany School of Natural History** (Buffalo Society of Natural Sciences, New York State Museum, and University of Buffalo). Allegany State Park, Quaker Bridge, N. Y. Robert E. Coker, Director. Second season. July 7-August 25, 1928.

**Field Course in Biology** (University of Pittsburgh). Erie, Pa. Marshall C. Graff, Director. July 2-August 10, 1928.

**Field Natural History** (University of Pittsburgh). Nawak-Wa Lodge, Forbes Forest, Rector P. O., Westmoreland Co., Pa. William Smith, Director. July 2-August 10, 1928.

**Course in Field Botany** (Duke University, Durham, N. C.). Lake Junaluska, N. C. B. G. Childs, Director. June 8-July 19, 1928.

**American School of Wild Life Protection.** McGregor, Iowa George Bennett, Director. Tenth session. August 7-18, 1928.

**Yosemite School of Field Natural History.** National Parks Service. Yosemite National Park, Calif. C. P. Russell, Park Naturalist. H. C. Bryant, Director. Fourth year. June 25-August 10, 1928.

If interested in the work of nature guides in National Parks, write Ansel F. Hall, Chief Naturalist, 213 Hilgard Hall, University of California, Berkeley, Calif.

**Field Courses in the Natural Sciences** (University of Wyoming). Medicine Bow Mountains, Centennial, Wyo. S. II. Knight, Director. June 11-July 20, 1928.

**Institute of Euthenics.** Vassar College, Poughkeepsie, N. Y. June 27-July 27, 1928. Annie Louise Macleod, Director. Courses in mental hygiene, child psychology, nutrition, and related subjects.

**Children's Science School.** Woods Hole, Mass. Director, Rossiter D. Olmstead. Fourteenth year. July 2-Aug. 10, 1928.

#### D. BIOLOGICAL STATIONS

From the Marine Biological Station, established by Anton Dohrn in 1870 at Venice—the forerunner of the Woods Hole Laboratory, when a group of students interested in marine life were assembled by Agassiz in a barn on Penikese Island, in 1873 (the summer before he died)—there have grown up institutions in all parts of the world offering exceptional advantages to those interested in the biological sciences. The following is a list of representative marine and fresh-water stations of this type in the United States. If the work of a biological

station is carried on under the auspices of another institution, the name of the parent institution is given in parentheses.

**Marine Biological Laboratory.** Woods Hole, Mass. Merkel H. Jacobs, Director. Forty-first year. June 27-August 7, 1928.

**Long Island Biological Association.** Cold Spring Harbor, N. Y. Reginald G. Harris, Director. Thirty-ninth year. June 27-August 8, 1928.

**Mount Desert Island Marine Biological Laboratory.** Salisbury Cove, Me. H. C. Tracy, Director.

**Marine Zoölogical Laboratory** (University of New Hampshire). Isles of Shoals, off Portsmouth Harbor, N. H. C. F. Jackson, Director. Opening season. June 25-August 3, 1928.

**U. S. Fisheries Biological Station.** Beaufort, N. C. For research only.

**Tortugas Laboratory** (Carnegie Institution of Washington). Tortugas via Key West, Fla. Research only.

**Bermuda Biological Station.** Agar's Island, Bermuda. E. L. Mark, Director. Research only.

**Biological Station** (University of Indiana). Winona Lake, Ind.

**Biological Station** (University of Michigan). Douglas Lake, Cheboygan, Mich. George R. LaRue, Director. Twentieth season. June 25-August 17, 1928.

**Franz Theodore Stone Laboratory** (Ohio State University). Gibraltar Island, Put-in-Bay, Ohio. Raymond C. Osburn, Director. Thirty-second season. June 18-August 31, 1928.

**Lakeside Laboratory** (University of Iowa). Lake Okoboji, Milford, Ia. G. W. Martin, Director. Twentieth year. June 11-August 17, 1928.

**Lake Enemy Swim Biological Station** (Northern State Teachers College, Aberdeen, S. D.). Waubay, S. D. Sidney R. Lipscomb, Director. July 16-August 24, 1928.

**Flathead Lake Biological Station** (University of Montana, Missoula, Mont.). Yellow Bay, Flathead Lake, Polson, Mont. Research only.

**Puget Sound Biological Station** (University of Washington). Friday Harbor, Wash. T. C. Frye, Director. Martin Johnson, Curator. June 18–August 17, 1928.

**Hopkins Marine Station** (Stanford University). Pacific Grove, Calif. Walter K. Fisher, Director. Thirty-sixth season. June 20–August 18, 1928.

**Marine Biological Station** (University of Southern California). Los Angeles, Calif. A. B. Ulrey, Director.

**Laguna Beach Marine Laboratory** (Pomona College). Laguna Beach, Calif. W. A. Hilton, Director. Eighteenth season. June 25–August 3, 1928.

**Scripps Institution of Oceanography**. La Jolla, Calif. T. Wayland Vaughan, Director. Research only.

**Marine Biological Station**. Honolulu, Hawaii. C. H. Edmondson, Director.

**Marine Biological Station** (University of Philippines). Puerto Galera, Mindoro, P. I. P. B. Sivickis, Director.

## **E. FIELD COURSES IN GEOLOGY AND GEOGRAPHY**

**European Course in Geology and Geography**. (Harvard University, Cambridge, Mass.) France, the Alps, Italy. Kirtley F. Mather, Director. June 29–July 30, 1928.

**Field Courses in Geology**. (University of Chicago, Chicago, Ill.)

Missouri Field Station. Ste. Genevieve County, Mo. Carey Croneis, Director. June 18–August 31, 1928.

Devil's Lake Region. Wisconsin. E. S. Bastin, Director. June 18–August 31, 1928. J. Harlan Bretz, Director. Month of September.

Columbia River Valley. Oregon and Washington. J. Harlan Bretz, Director. July 18–August 15, 1928.

**Field Courses in Geology**. (University of Colorado, Boulder, Colo.)

**Field Courses in Geology.** (University of Minnesota, Minneapolis, Minn.) A four-weeks lecture-travel course. Ira N. Allison, Director. June 26-July 22, 1928.

**Field Work in Physiography.** (Columbia University.) Western Region and Eastern Region trips conducted by A. K. Lobeck. Southern Region trip conducted by F. J. Wright. One trip before and one after summer session.

**Geological Field Course in the Lake Superior Region.** (Northwestern University.) Itinerary from Ely, Minn. U. S. Grant, Director. August 10-31, 1928.

**Geology and Geography, Field Courses in Kentucky.** (University of Michigan, Ann Arbor, Mich.) Mills Springs, Kentucky. June 19-July 28, 1928. Courses for men.

**A Summer Course of Geology in the Alps.** (Wellesley College and the University of Geneva.) Write to Miss R. A. Doggett, Geology Dept., Wellesley College, Mass. July 9-30, 1928.

**Summer Field Course in Rocky Mountain Geology.** (Columbia University, New York City. Conducted jointly with University of Wyoming Summer Camp.) Centennial, Wyo. Chas. P. Berkey, Supervisor. June 20-July 24, 1928.

**Summer School of Geology and Natural Resources.** (Princeton University, Princeton, N. J.) Richard M. Field, Director. Third season. June 21-August 2, 1928. Party limited to 23 members. Travels in a specially constructed sleeping, dining, and lecture car.

**Summer Travel Courses in Geology.** (University of North Carolina.) Itinerary crosses West Virginia, Virginia, and North Carolina. Gerald R. MacCarthy, Director. June 18-July 20, 1928.

**Transcontinental Field Trip.** (Clark University, Worcester, Mass.) Itinerary includes San Francisco, Los Angeles, and return, by de luxe motor coach. Preston E. James, Director. July 9-August 24, 1928.



**F. ENGINEERING CAMPS**

**Camp Columbia** (Columbia University). Lakeside, near Litchfield, Conn. Professor J. K. Finch, Director. June 4-August 12, 1928. Courses in civil, mining, metallurgical, and sanitary engineering.

**Field Work in Surveying** (Massachusetts Institute of Technology). Camp Technology, Gardner's Lake, East Machias, Maine. George L. Hosmer, W. Maxwell Fife, Directors. July 27-September 16, 1927.

**Summer Mining Camp** (Massachusetts Institute of Technology). Dover, N. J. W. C. Eberhard, Director. July 25-September 24, 1927.

**Surveying Camp** (University of California). Camp California, Fairfax, Marin Co., Calif. F. S. Foote, Director. May 14-June 11, 1928.

**SUMMER FIELD COURSES.** (Add other materials in space below.)

## G. TRAVEL

**American Travel Number.** Science News Letter No. 366, April 14, 1928. Science Service, 21st and B Sts., N.W., Washington, D. C. 15c a copy. \$5.00 a year.

Lists of National Parks, Zoological Gardens, Museums, etc., with annotations and articles on National Forests; Petrified Forests; What Geology to See and Where; Landmarks of Ancient America; Rambling Around U. S. Observatories; Part of the Log of Columbus, etc., etc.

**European Travel Number.** Science News Letter No. 365, April 7, 1928. Science Service, 21st and B Sts., N.W., Washington, D. C. 15c a copy. \$5.00 a year.

This issue contains the following articles: "The Science of an Ocean Voyage," "Classic Scenes of Science," "Europe's Weather Stations," "Seeing Science in Germany," "Europe's Volcanoes," "A Chemist's Europe," "Zoological Gardens," "Museums," and special notes on various cities. A veritable storehouse of the kind of facts usually difficult to unearth. May be consulted in nearly any good library.

**Glimpses of Our National Parks.** National Parks Service, Department of the Interior, Washington, D. C. Free.

This bulletin, as well as "Glimpses of Our National Monuments," and a separate bulletin on each Park, is fully illustrated and emphasizes the nature study advantages in the national parks.

**The Shenandoah National Park.** Shenandoah National Park Association, 19 Warren St., New York City. Free.

An illustrated folder, with map and descriptions of this proposed park.

**Maps and Booklets.**

Most railway and steamship lines, as well as many travel agencies and hotels, issue maps and illustrated booklets, which, however, it is not within the scope of this work to list separately.

**SUMMER ACTIVITIES FOR SCIENCE TEACHERS.**

(Add other materials in space below.)

## XI. PROFESSIONAL ASSOCIATIONS

The founding of philosophical societies and scientific associations in the seventeenth century gave great impetus to the exploration and research which have increasingly extended the bounds of human knowledge.<sup>1</sup> So to-day, group organizations of teachers in special fields are making themselves felt in many ways. Organized effort has materially aided in furthering recognition of science studies in the curriculum.

Surely in the following list every science teacher can find at least one group in which both the teacher and the association will profit by his membership.

Teachers' associations seldom have permanent addresses, since the name and address of the president or other officer is subject to change from year to year.

### **The American Association for the Advancement of Science.** President, Henry Fairfield Osborn.

Dues \$5.00 a year, which include subscription to "Science" (weekly), or to the "Scientific Monthly." Write the Permanent Secretary, Smithsonian Building, Washington, D. C., for "Booklet of Information on the Organization and Work of the Association." "The objects of the Association are to promote intercourse among those who are cultivating science in different parts of America, to coöperate with other scientific societies and institutions, to give a stronger and more general impulse and more systematic direction to scientific research, and to procure for the labors of scientific men increased facilities and a wider usefulness." The Association has a special Committee on the Place of Science in Education, Chairman, Otis W. Caldwell, Teachers College, 525 West 120th St., New York City. If interested write to the chairman for recent report of this committee.

### **American Association for Medical Progress, 370 Seventh Ave., New York City.** Benjamin C. Gruenberg, Managing Director.

Dues, including "Medical Progress," a quarterly, \$2.00 a year. "To diffuse among the lay public an understanding of research methods in medical science."

<sup>1</sup> See *The Role of Scientific Societies in the Seventeenth Century*. Martha Ornstein University of Chicago Press. 278 pp. \$3.15.

**American Association of Teachers of the Mathematical and Natural Sciences.** Secretary, William A. Hedrick, Central High School, Washington, D. C.

Affiliated with the American Association for the Advancement of Science.

**American Microscopical Society.** Secretary, H. J. VanCleave, University of Illinois, Urbana, Ill.

Affiliated with the A. A. A. S. Dues \$2.00, including "Transactions of the Society."

**American Nature Study Society.** Secretary, E. Laurence Palmer, Cornell University, Ithaca, N. Y.

Dues, 50c a year, include reports of the proceedings. Membership open to anyone interested. Affiliated with the A. A. A. S.

**American Society of Naturalists.** Secretary, L. J. Cole, College of Agriculture, Madison, Wisc.

One of the earliest organizations in this country. Dues, \$1.00 a year, include the "Records."

**Association of Agricultural Teachers of New York.** President, Edward R. Hoskins, Trumansburg, N. Y.

Annual dues, \$1.50, include "Agricultural Teachers Bulletin." Regional chairmen and meetings in many parts of the state.

**Association of Science Teachers of the Middle States and Maryland.** President, Charles E. Dull, Newark, N. J.

Dues, \$1.00 a year, include "Proceedings of Association of Colleges and Secondary Schools of the Middle States and Maryland."

**California Association of Agricultural Teachers.** President, W. C. Patchett, Santa Rosa High School, Santa Rosa, Calif.

Dues, \$1.00 a year, with "News Letter" from state office. State divided into five districts, which hold semi-annual meetings.

**Central Association of Science and Mathematics Teachers.** President, W. F. Roecker, Boys Technical High School, Milwaukee, Wisc.

Dues, \$2.50 a year, include "School Science and Mathematics."

**Chemistry Teachers Club.** Treasurer, Fred C. Fair, 156 Decatur St., Brooklyn, N. Y.

Dues, \$2.00 a year.

**Connecticut Science Teachers Association.** Chairman, Elbert C. Weaver, Bulkeley High School, Hartford, Conn.

Dues, \$1.00 for men, 50c for women. A section of the Connecticut State Teachers Association. Annual meetings.

**Department of Science Instruction, N. E. A.** President, F. D. Curtis, University of Michigan, Ann Arbor, Mich.

No separate dues. Meets with the general summer session of the National Education Association.

**Division of Chemical Education, American Chemical Society.** Secretary, Ross A. Baker, Syracuse University, Syracuse, N. Y.

Dues, 50c a year. Two national meetings with American Chemical Society.

**Eastern Association of Physics Teachers.** President, Roy R. Hatch, Mount Hermon School, Mount Hermon, Mass.

Dues—active \$3.00, associate \$2.00, with reports of proceedings.

**History of Science Society.** President, Lynn Thorndike, Columbia University, New York City.

Dues, \$5.00 a year, include the quarterly, "Isis."

**Illinois State Academy of Science.** President, Clarence Bonnell, Harrisburg, Ill.

Dues, \$1.00, including "Transactions of the Academy." Coöperates with schools.

**Indiana Academy of Science.** President, Frank B. Wade, Shortridge High School, Indianapolis, Ind.

Special welcome to teachers as members. Dues, \$1.00, include "Proceedings of the Academy." Conducts many field trips.

**Iowa Association of Science Teachers.** President, John R. Coulson, East Waterloo High School, Waterloo, Iowa.

An organization of high school and college teachers.

**Langley Association of Science Teachers.** President, Charles A. Gorgas, Peabody High School, Pittsburgh, Pa.

Dues, \$2.00 a year, include reports of meetings. Field trips or other meetings are held about once a month.

**Metric Association.** President, George F. Kunz. Office of the Association, 156 Fifth Ave., New York City.

Dues, \$2.00 a year, include quarterly magazine, "Measurement."

**National Council of Geography Teachers.** Secretary, George J. Miller, State Teachers College, Mankato, Minn.

Dues, \$2.00 a year, include "The Journal of Geography."

**National Council of Supervisors of Nature Study and Gardening.** President, E. Laurence Palmer, Cornell University, Ithaca, N. Y.

Membership limited to teachers and supervisors of nature study and gardening in actual service. Affiliated with the Department of Superintendence of the National Education Association.

**New England Association of Chemistry Teachers.** Secretary, Octavia Chapin, High School, Malden, Mass.

Dues—active \$3.00, associate \$1.50, with quarterly report of meetings.

**New Jersey Science Teachers Association.** President, George Winchester, New Brunswick, N. J.

Members principally high school teachers.

**New York Association of Biology Teachers.** President, George T. Hastings, Theodore Roosevelt High School, New York City.

Annual dues, \$1.00. Meets once a month, usually at the School Service Building of the American Museum of Natural History.

**Physics Club of New York.** Secretary, John W. McCormack, Jamaica High School, Jamaica, Long Island, N. Y.

Meetings monthly. Dues, \$1.00 a year.

**School Nature Union.** Secretary, Henry E. Turner, 1 Grosvenor Park, Camberwell, S.E., England.

Annual subscription, four shillings, includes "School Nature Study," quarterly. Send for list of leaflets published by this society.

**Science League of America.** President, Maynard Shipley, 509 Gillette Bldg., 830 Market St., San Francisco, Calif.

Dues, \$3.00 a year. "For the defense of freedom of teaching." Write for descriptive booklet, "A Challenging Situation."



**Science Masters Association.** Secretary, I. M. Bankes-Williams, Lincoln House, Harrow-on-the-Hill, Middlesex, England.

Annual subscription, 10 shillings, includes the quarterly, "School Science Review." Has a few members in the United States.

**Secondary Science Section.** New York Society for the Experimental Study of Education. Chairman of the Section, Milton G. Wolf, James Madison High School, New York City.

Dues, \$2.00 a year. Annual volume of "Contributions to Education," and a monthly bulletin.

**Southern California Science and Mathematical Association.** Secretary, A. A. Bisutti, Roosevelt High School, Los Angeles, Calif.

Dues, \$1.00 a year. Meetings four times a year.

**Visual Instruction Association.** President, Ernest L. Crandall, 500 Park Ave., New York City.

Membership composed of teachers interested in this phase of instruction.

**Directory of Science Societies.** School Science and Mathematics, May, 1927, p. 544. Mt. Morris, Ill.

Lists all the officers of most of these societies.

The list of affiliated societies of the American Association for the Advancement of Science gives practically all of the more specialized academies and associations.

A very complete list of organizations, with extensive information as to their purpose and work, is given on pages 30 to 103 in "The Nature Almanac," published by the American Nature Association, Washington, D. C. \$1.00

PROFESSIONAL ASSOCIATIONS. (Add other materials  
in space below.)

## XII. TESTS AND SCIENCE VOCABULARIES

Since 1900 a number of studies have been made which show the unreliability of teachers' marks. For example, Starch and Elliott found that the marks of 142 teachers on the same examination paper in English varied from 50 to 98, the greatest number (13) assigning 80. There were similar results when an identical paper in geometry was graded by 115 mathematics teachers. Here the lowest mark was 28, the highest 92—a greater range of difference than for the English paper. (Reported in the *School Review*, 20: 442-57, 1912; 21: 254-59, 1913; 26: 676-81, 1918. See also "Teachers' Marks," by F. J. Kelly. *Contributions to Education* No. 66, 1914 Teachers College, Columbia University, New York City.) School marks, then, it would seem, depend more on the teacher's standards of values than on what the pupil knows or can do.

During this period, both intelligence tests and objective tests in subject matter (achievement or educational tests) have been in the process of development. Mental and educational tests have been more carefully developed and more widely used in the elementary school than in the high school, but the application of standardized measures in the secondary school has recently been receiving widespread attention. According to Symonds, the best of these secondary school tests are in the sciences.

In the following pages are enumerated some of the best available objective tests in the high school sciences, many of which are standardized, selected references as to their construction, and certain science word lists.

**Classroom Procedure Test in Natural Science.** Harry A. Cunningham and Douglas Waples. For rating methods of teaching in junior and senior high schools. University of Chicago Press, Chicago, Ill. 10c a copy, \$1.25 for 25.

**Test of Laboratory Resourcefulness.** Hanor A. Webb. *School Science and Mathematics*, Vol. XXII, 259-266. (Partially standardized, not depending to any great extent on subject matter.) Mount Morris, Ill. 35c a copy.

**A. GENERAL SCIENCE**

**General Science Examination.** J. T. Giles, S. M. Thomas, and H. W. Schmidt. Eau Claire Book and Stationery Co., Eau Claire, Wisc. \$3.00 a dozen sets.

**General Science Scales.** A. Dvorak. Public School Publishing Co., Bloomington, Ill. 50c for 25.

**General Science Test.** S. R. Powers. Bureau of Publications, Teachers College, Columbia University, New York City. \$2.00 for 100.

**General Science Test.** G. M. Ruch and H. F. Popenoe. World Book Co., Yonkers, N. Y. \$1.30 for 25.

**Reading Scales in General Science.** M. J. Van Wagenen. Public School Publishing Co., Bloomington, Ill. \$3.00 for 100.

**Tests on Everyday Problems in Science.** C. J. Pieper and W. L. Beauchamp. Scott, Foresman & Co., 623 South Wabash Ave., Chicago, or 5 West 19th St., New York City. 2c a copy.

**Home Mechanics Test.** L. V. Newkirk and G. D. Stoddard. Bureau of Educational Research and Service, University of Iowa, Iowa City. \$4.00 a 100.

**Technical Information Test.** L. L. Thurstone. World Book Co., Yonkers, N. Y. \$1.00 for 25.

**Group Form Tests.** E. R. Downing. E. R. Downing, School of Education, University of Chicago, Chicago, Ill. 70c for 100.

**B. BIOLOGY**

**Biology Test.** G. M. Ruch and L. H. Cossman. World Book Co., Yonkers, N. Y. \$1.30 for 25.

**Biology Test.** O. W. Richards. C. H. Stoelting Co., 424 North Homan Ave., Chicago, Ill. \$1.40 for 25. \$4.20 for 100.

**Biology Test.** E. B. Jordan and T. G. Foran. Catholic Education Press, Brookland Station, Washington, D. C. \$1.00 for 25.

**Information Exercises in Biology.** J. L. Coopridge. Public School Publishing Co., Bloomington, Ill. 50c for 25.

**Test in General Biology.** Mervin E. Oakes and S. R. Powers. Bureau of Publications, Teachers College, Columbia University, New York City. Now in experimental form. Available for general use, January, 1929.

**Michigan Botany Test.** O. W. Laidlaw and Clifford Woody. Public School Publishing Co., Bloomington, Ill. \$1.00 for 25.

**Health Knowledge Test.** A. I. Gates and Ruth Strang. Bureau of Publications, Teachers College, Columbia University. \$3.00 for 100.

**National Agricultural Tests.** C. E. Myers, 204 Horticulture Bldg., State College, Pennsylvania. \$1.00 for 25.

### C. CHEMISTRY

**Chemistry Tests.** E. R. Glenn and L. E. Welton. Write E. R. Glenn, The Montclair State Teachers College, Montclair, N. J. For use in investigation only.

**Chemistry Tests.** J. W. Rauth and T. G. Foran. Catholic Education Press, Brookland Station, Washington, D. C. \$1.00 for 25.

**Chemistry Test.** S. G. Rich. Public School Publishing Co., Bloomington, Ill. \$1.00 for 25.

**Chemistry Tests.** B. J. Rivett, Northwestern High School, Detroit, Mich. \$1.00 for 100.

**Columbia Research Bureau Tests in Chemistry.** Eric Jette, S. R. Powers, and Ben D. Wood. World Book Co., Yonkers, N. Y. In preparation.

**General Chemistry Test.** S. R. Powers. World Book Co., Yonkers, N. Y. \$1.10 for 25.

**Harvard Test in High School Chemistry.** H. L. Gerry. Ginn & Co., Boston, Mass. 36c for 30.

**Iowa Placement Examination: Chemistry.** (Revised) G. D. Stoddard and J. Cornog. Bureau of Educational Research and Service, University of Iowa, Iowa City, Iowa. \$3.50 for 100.

## D. PHYSICS

**Columbia Research Bureau Physics Test.** H. W. Farwell and B. D. Wood. World Book Co., Yonkers, N. Y. \$1 30 for 25.

**Harvard Test in Elementary Physics.** H. N. Black and F. M. Burlingame. Ginn & Co., Boston, Mass. 45c for 30

**Iowa Achievement Examination: Physics.** C. J. Lapp. Bureau of Educational Research and Service, State University of Iowa, Iowa City, Iowa. \$3.00 for 100.

**Iowa Placement Examinations: Physics.** (Revised.) G. D. Stoddard and C. J. Lapp. Bureau of Educational Research and Service, University of Iowa, Iowa City, Iowa. \$3.50 for 100.

**Physics Scales.** J. M. Hughes. Public School Publishing Co., Bloomington, Ill 50c for 25.

**Physics Test.** Daniel Starch. Write author, 1374 Massachusetts Ave., Cambridge, Mass.

**Physics Test.** T. A. Smits and S. R. Powers. Bureau of Publications, Teachers College, 525 West 120th St., New York City. Now in experimental form.

**Physics Tests.** E. R. Glenn and E. S. Obourn. Write E. R. Glenn, The Montclair State Teachers College, Montclair, N. J. For investigational purposes only.

**Union Science Tests in Physics.** Practice sheets. F. T. Jones. University Supply and Book Co., 10,109 Wilbur Ave., Cleveland, Ohio. 25c a set.

**Vocational Guidance Test: Physics.** L. L. Thurstone. The World Book Co., Yonkers, N. Y. \$1.00 for 25.

## E. SELECTED BIBLIOGRAPHY

**Ability Standards for Standardized Achievement Tests in the High School.** Percival M. Symonds. Bureau of Publications, Teachers College, 525 West 120th St., New York City. 1927. \$1.00.

The report of a study "undertaken for the purpose of showing the possibilities of more extensive use of standardized tests in the high school." Includes three science tests. Very valuable information.

**Improving Schools by Standardized Tests.** Samuel S. Brooks and B. R. Buckingham. Houghton, Mifflin Co., Boston, Mass. 1922. \$1.75.

Includes both intelligence and achievement tests. Special mention of General Science, pp. 219ff. Two chapters on "Teaching Pupils How to Study."

**Improvement of the Written Examination.** G. M. Ruch. 1924. Scott, Foresman Co., 633 South Wabash Ave., Chicago, Ill. \$1.80.

Probably the best handbook on this subject for the classroom teacher—brief, helpful, based on experience. Several sections on science.

**Classroom Tests.** Charles Russell. Ginn & Co., 70 Fifth Ave., New York City. 1926. \$1.60.

— Written as a handbook for the classroom teacher on the construction, kinds, and uses of non-standardized objective tests.

**A General Science Test.** H. A. Toops. School Science and Mathematics, 25: 817-822, November, 1925. Mount Morris, Ill. 35c.

Excellent description of steps in constructing a test.

**Measurements in Secondary Education.** P. M. Symonds. Macmillan Co., 60 Fifth Ave., New York City. 1927. \$2.50.

A critical appraisal of work in the field of testing. Chapter VII devoted to tests in science.



**Standardizing Teachers' Examinations and the Distribution of Class Marks.** Robert S. Ellis. Public School Publishing Company, Bloomington, Ill. 170 pp. 75c.

"Standardizing teachers' examinations of knowledge of subject matter by making them as objective as possible; making test marks definite, and interpreting the meaning of these marks. It is very important that every teacher understand the elementary principles of constructing and scoring tests, so that the present errors in classroom testing may to a considerable extent be overcome. This little manual is an attempt to supply in convenient form and in language as simple as possible a guide for the construction and scoring of tests, so that the average teacher without special training in psychology, statistics, and mental measurement may be enabled to give very much better tests and with considerable economy of time."

**Tests and Measurements in High School Instruction.** G. M. Ruch and G. D. Stoddard. World Book Co., Yonkers-on-Hudson, N. Y. 1927. \$2.20.

An authoritative, comprehensive treatment of test construction. Science tests discussed in Chapter VII.

**Objective Tests in High School Subjects.** Published by author, George Frederick Miller, Norman, Okla. 1926. \$1.25.

Illustrative tests of various types for most of the high school subjects.

**Traditional Examinations and New-Type Tests.** C. W. Odell. The Century Co., 353 Fourth Ave., New York City. \$2.25.

A non-technical treatment intended either for the teacher in service or as a textbook. One chapter discusses the best types of traditional examinations. Other parts of the book give explanations and samples of various new-type tests.

**Botany Drill Book.** H. G. Baker, Southwestern College, Winfield, Kans. 25c.

One thousand objective questions arranged by topics.

**New-Type Questions in Chemistry.** C. G. Cook. Globe Book Co., 175 Fifth Ave., New York City. 1927. 80c.

Suggested questions of many types, arranged by the topics into which textbooks are usually divided. Helpful for students and teachers. Also, Dinsmore's "Chemical Calculations," \$1.20, which

gives the computations necessary in studying chemistry, with tables in more convenient form than is found in most texts. The above publishing house specializes in brief guides and notebooks for high school subjects, including many for the sciences.

**Preparation and Use of New-Type Examinations.** Donald G. Paterson. World Book Co., Yonkers, N. Y. 87 pp. 1925. 60c.

A manual for the classroom teacher. Discusses principles, types of questions, advantages and disadvantages of each form of question, with directions for the test as a whole. Very helpful.

**Diagnostic Study of High School Chemistry.** S. R. Powers. Bureau of Publications, Teachers College, Columbia University, New York City \$1.25.

No doubt the most extensive and scientific program of testing ever attempted in a science subject.

**Bibliography of Objective Tests in Science.** University of the State of New York, Albany, N. Y. Free.

## F. VOCABULARY STUDIES

**Technical Vocabularies of the Public School Subjects.** Luella C. Pressey. Public School Publishing Co., Bloomington, Ill. Sample of any list 5c.

There are fifteen lists published separately; among them are:

No. 6—General Science...\$1.50	No. 9—Geography .....\$1.10
No. 7—Biology ..... 1.50	No. 10—Physics ..... 1.10
No. 8—Chemistry ..... 1.50	No. 11—Physiology ..... 1.10

Prices are for package of 35.

**The Vocabularies of High School Science Textbooks.** S. R. Powers. Teachers College Record, Vol. 26: 368-382. January, 1925. Bureau of Publications, Teachers College, Columbia University, New York City. 35c a copy.

Lists of words with data on frequency of occurrence in various textbooks.

**A Vocabulary of Scientific Terms for High School Students.** S. R. Powers. Teachers College Record, November, 1926. Bureau of Publications, Teachers College, Columbia University, New York City. 35c a copy.

A composite list based on the previous study. Bound separately, 25c.

**Classical Origins of Scientific Terms.** Gonzalez Lodge. Latin Notes Supplement, No. 26, November, 1927. Service Bureau for Classical Teachers, 525 West 120th St., New York City. 20c.

Based on the Powers vocabulary. Useful both to science and to Latin teachers.

**The Pronunciation and Spelling of Words Used in Science.** D. Roller. General Science Quarterly, 11:18-28, November, 1926. 40c a copy.

Discussion of principles, analysis of common errors, and lists of scientific terms frequently mispronounced and misspelled.

**The Vocabulary of Scientific Articles in Daily Newspapers.** Francis D. Curtis. School Science and Mathematics, 26: 982-988, December, 1926. Mt. Morris, Ill. 35c a copy.

An analysis of the terms used in science articles in newspapers and the proposal to use such findings in determining, in part, what shall be taught in high school science courses.

**TESTS AND SCIENCE VOCABULARIES.** (Add other materials in space below.)

### XIII. ELEMENTARY SCIENCE

Present-day leaders in the field of science are working toward a unified course of study, rich in life applications, from the kindergarten through college. Teachers in elementary schools who are developing such a program have constant use for illustrative materials. For them many of the items listed in this guidebook will be valuable.

In this section are listed a few of the textbooks and other writings which may help the science teacher to recognize this trend toward a unified science course; and perhaps to influence him to lend his aid in working out this integrated continuity of science through all grade levels.

**Elementary Science in Horace Mann School.** Gerald S. Craig. Bureau of Publications, Teachers College, Columbia University, New York City. 3 pamphlets: Grades I and II. Grades III and IV. Grades V and VI. 90c each.

Especially valuable and suggestive introductory sections on the place of science, techniques for constructing a course of study in science, subject matter for the pupil, and helps for the teacher. Published separately is the author's "Certain Techniques Used in Developing a Course of Study in Science for the Horace Mann Elementary School." \$1.50. In the work in science at Horace Mann School there is a typical illustration of the point of view outlined above.

**Elementary Science by Grades.** Persing and Peeples. Edited by Frank W. Ballou. D. Appleton and Co., 35 West 32nd St., New York City. Grade 2, 72c and Grade 3, 80c; others in preparation.

Another of the modern scientifically constructed courses of study.

**Health and Happiness Series.** Newmayer and Broome. American Book Co., 80 Lexington Ave., New York City.

Books in the series are:

The Playroad to Health. 144 pp. 64c.

Health Habits. 207 pp. 72c.

The Way to Keep Well. 264 pp. 84c.

The Human Body and Its Care. 314 pp. 96c.

**Nature Study—Health Education.** Alice Jean Patterson. McKnight and McKnight, Publishers, Normal, Ill.

A series for Grades 4, 5, and 6; text and notebook for each grade. Various prices.

**The Laws of Health and How to Teach Them.** Winslow and Williamson. Charles E. Merrill Co., 440 Fourth Ave., New York City. 354 pp. 1925. \$1.60.

Outlines for the teacher a course of study from first grade through senior high school, with many chapters on teaching special health topics. Good chapter on mental hygiene.

**Course in Science.** Studies in Education, Francis W. Parker School, 330 Webster Ave., Chicago, Ill. 168 pp. 1918. 45c.

An outline of a course, with much experimental work, for all the grades through high school. Discusses general principles and bases the science study entirely upon the interests, activities, and problems of the pupil.

**Science in the University Elementary School.** Bernice E. Stormes. Leaflet No. 13. University of Iowa, Iowa City, Iowa. Free.

A description of curriculum and method in another of the modern experimental schools.

**Criteria for Evaluating Elementary Science Courses.** Bureau of Curriculum Research, Teachers College, Columbia University, New York City.

A rating sheet used in studying courses of study. Also a similar rating sheet for junior high school science courses.

**Elementary Science as a Preparation for Citizenship.** George W. Hunter. American Book Co., 80 Lexington Ave., New York City. Free.

A leaflet rich in suggestion as to the possibilities in science properly taught.

**The Aims of Education and the Rôle of Science in Their Realization.** Chap. V in "How to Teach General Science," by J. O. Frank. Blakiston and Co., Philadelphia, Pa. \$2.00.

Considers science as a continuous course through the elementary and the secondary schools.

**Biology in Elementary Schools.** H. B. Torrey. American Social Hygiene Association, 370 Seventh Ave., New York City. 10c.

A report of the introduction of biology into the grade schools of three Oregon communities and its contribution to sex education.

**Children and Adult Summer Activities in Science.** Gerald S. Craig, Horace Mann School, Broadway at 120th St., New York City. 5c.

A mimeographed bibliography with suggestions.

**Teaching of Science in the Elementary School.** Gilbert S. Trafton. Houghton, Mifflin Co., Boston, Mass. 1918. \$1.90.

One of the Riverside Textbooks in Education series. Valuable suggestions. Bibliography. Early but not antiquated.

Many of the items in the next section, PAMPHLETS, and in other sections of this book are also of value to the teacher of elementary science.

**ELEMENTARY SCIENCE.** (Add other materials in space below.)

#### XIV. PAMPHLETS

Under this head have been listed not only pamphlets, but also catalogs, bulletins, and booklets. A few books are included because they can be obtained without charge and are really a part of the literature which certain firms distribute concerning their products.

The compilers are aware that this material is of very uneven teaching quality. Some of the publications have value only because of the pictures they contain or because they give some illuminating comment on the application of a scientific principle; others are restricted in value because of the unwillingness of the company to provide more than one copy. It can be said, however, that all of the publications listed have been examined, and all have been found to have some value. This is particularly true of that smaller number of publications which are supplied in sufficient number to give one to each student, or at least to supply an entire class. In many of these there is invaluable material which does not appear in textbooks. However, since much of this material is distributed free, a constant danger to avoid is that of ordering more than can be properly cared for or actually used.

References are given on the care of pamphlets and books, with names of companies dealing in the necessary supplies. Many of the pamphlets listed are of value in subjects other than the four science courses usually offered in high school,—general science, biology, physics, chemistry. Teachers of geography, hygiene, first aid, domestic science, carpentry and shop, industrial arts, and fine arts—will also find many items of value in this section. The teachers in the elementary school will find this material very stimulating. With proper guidance, pupils can use materials of this nature for developing many interesting and worth-while projects, class reports, and the like. Many of these booklets are worthy of a place (especially when in pamphlet binders) as references on the shelves of the school library and of the science department.



### A. CARE OF ILLUSTRATIVE MATERIAL

Some sort of filing system is essential if the large quantity of illustrative material that may be gleaned from current magazines and newspapers, from pictures, from advertising circulars, and the like, is to be readily available for bulletin boards or for classwork. The ideal way, undoubtedly, for keeping pictures, pamphlets, and similar materials so that they will be readily available is to use a filing cabinet (or vertical file) with a card index. When large files are not obtainable, the boxes called "transfer cases" hold almost as much and are considerably less expensive. Other systems are nearly as useful. If shelves are already in the classroom, letter files or pamphlet boxes may be used to advantage. The so-called "utility file" is convenient for materials of which there are few copies of each kind. Whatever provision is made for keeping them, such materials should be classified as nearly as possible according to the teaching units (lesson topics) of the course or courses in which they are used. No system is good which is burdensome or which does not make it easy to find things when they are wanted. A plan which has proved successful in a number of schools is to have a class librarian assist the teacher in keeping these files in order.

#### Equipment for Filing

The following firms should be consulted in regard to filing equipment:

Baker Vawter Co., Benton Harbor, Mich.

The Globe Wernicke Co., Cincinnati, Ohio.

Multiplex Display Fixture Co., 918 North 10th St., St Louis, Mo.

Remington Rand Business Service, Tonawanda, N. Y.

H. Schultz and Co., Circular W, 517 West Superior St., Chicago, Ill.

William F. Wholey Co., Inc., Equipment Specialists, 11 East 36th St., New York City.

Yawman and Erbe Mfg. Co., 368 Broadway, New York City.

#### Care of Material

**Library Bulletin Box.** No. B 75. 4"x7"x11". Central Scientific Co., 460 East Ohio St., Chicago, Ill. 35c.

**Pamphlet Files and Binders.** Library Bureau, 451 Broadway, New York City.

On pages 53 to 55 in the catalog are listed materials for caring for pamphlets. No 1719 costs 25c each or \$2.55 a dozen.

**Utility File.** Letter size. Any stationery store. 35c up.

Expands like a bellows or accordion.

**How to Keep Scraps.** Science News Letter, p. 53, July 28, 1928. 21st and B Sts., N. W., Washington, D. C. 15c a copy.

An article by the well-known director of Science Service, E. E. Slosson, giving his preferred methods of filing clippings, pamphlets, and the like.

**Suggestions for the Care and Use of Pamphlets and Clippings in Libraries.** O. P. Dickey. H. W. Wilson Co., 958 University Ave., New York City.

Complete directions for the care of unbound material. Good bibliography. Now out of print, but probably in library.

**The Vertical File.** J. C. Dana. H. W. Wilson Co., 958 University Ave., New York City. 50c.

Describes completely the organization and use of a vertical file. Subject headings with cross references are given.

**Vertical File in Every Library.** Ovitz and Miller. Library Bureau, 451 Broadway, New York City. Free.

Directions for filing and cataloguing clippings, pictures, and pamphlets. Also booklet, "How to Organize a Library."

**Vertical Filing Down to Date.** Yawman and Erbe Co., 368 Broadway, New York City. Free.

Directions for filing systems are given in detail in this booklet, together with descriptions of the necessary equipment.

**Better Methods and Materials in Bookmending.** Zana K. Miller. Library Bureau, 451 Broadway, New York City. Free.

Full directions and lists of materials needed for the mending of books.

**Bookbinding.** Merit Badge Series. Boy Scouts of America, 2 Park Ave., New York City. 20c.

Specific directions for learning the skills necessary to win this merit badge. Useful instructions for anyone interested in caring for books.

**Bookcraft.** Gaylord Bros, 155 Gifford St., Syracuse, N. Y. Free.

Describes methods of repairing books. The catalog of this company is rich in suggestions on the care of pamphlets and books.

**How to Do Your Own Bookbinding.** Little Blue Book No. 1192. Haldeman-Julius Co., Girard, Kansas. 5c.

Simple directions on the care of books and pamphlets, how to protect and make the bindings.

**Mending and Repair of Books.** M. W. Brown. American Library Association, 86 East Randolph St., Chicago, Ill. 25c.

Simple directions for book repairing. Lists of mending supplies given.

### Supplies

The following firms deal in supplies for the care of pamphlets, pictures, post cards, lantern slides, etc. Send for their catalogs.

Democratic Printing Co., Madison, Wisconsin.

Gaylord Brothers, 155 Gifford St., Syracuse, N. Y.

Library Bureau, 451 Broadway, New York City.

Elbe File and Binder Co., 215 Greene St., New York City.

(See also p. 233.)

**B. GENERAL SCIENCE AND BIOLOGY****Science and the Home****THE HOUSEHOLD**

**The Business of Being a Housewife.** Armour and Co., Chicago, Ill. Free.

Meat cuts, food charts, menus, etc., of many types are described in this bulletin.

**A Friend in Need.** Church and Dwight. 27 Cedar St., New York City. Free.

A valuable little booklet explaining the use of baking soda (sodium bicarbonate) as a household remedy and dentifrice. Also, "The Care of Teeth," "Bathing for Health," etc.

**Fuel Manual for the Home.** Smithsonian Institution, Washington, D. C. Free.

Excellent facts on the proper use of various fuels in the stoves and furnaces most commonly found in the household.

**Home Washing Helps.** Colgate and Co., Household Service Bureau, 105 Hudson St., Jersey City, N. J. Free.

A series of bulletins on soap, textiles, stains, etc. Each of these may be obtained in quantities for class use.

**Running Water for the Home.** Catalog 16. Goulds Pumps, Inc., Seneca Falls, N. Y. Free.

Describes automatic water systems, especially for rural homes. Other booklets describe how various kinds of pumps work.

**Household Bacteriology.** Lesson No. 31, Reading Course. College of Agriculture, Cornell University, Ithaca, N. Y. Free.

Simple, practical information, and suggestions concerning the kinds of bacteria which cause the most trouble in a house.

**Household Handbook.** Johnson and Johnson, New Brunswick, N. J. Free.

Many facts about child care, communicable diseases, and first aid.

**A Mother's Manual.** Ralston Purina Co., St. Louis, Mo. Free.

A little booklet containing hints on diet, especially for growing children; symptoms of common diseases; care and prevention of colds; and recipes.

**Manufactured Gas.** American Gas Association, 420 Lexington Ave., New York City. Free.

Prepared especially for schools. Includes the history of the discovery and introduction of gas; the manufacturing process, with diagrams; and how a gas meter works.

**Our Public Utilities.** New Jersey Public Utility Information Committee, 313 Market St., Camden, N. J. Free.

A group of four booklets: "Electricity, How It Is Generated and Distributed"; "Telephone, History and Method of Operation"; "Electric Railways"; "Gas, How It Is Made and Delivered." They give much information on the industrial products which are known as public utilities, with historical facts, practical hints, diagrams, and discussion topics. There is an office in nearly every state. Write to the Director of Publicity, N. E. L. A., 420 Lexington Ave., New York City, for the address of the committee in your state.

**Materials for the Household.** U. S. Bureau of Standards, Circular No. 70 Superintendent of Documents, Washington, D. C. 25c.

Standard kinds of things used about the house. Substances and appliances of all kinds described.

**The Modern Home.** The Service Editor, McCall's Magazine. 236 West 37th St., New York City. 10c and postage.

A booklet on how to equip the home with mechanical servants, and how to manage it wisely. Useful facts about science as utilized in household appliances.

**Rescuing Precious Hours.** Procter and Gamble. Post Office Box 1801, Cincinnati, Ohio. Free.

A booklet on the removal of stains from fabrics.

**Vegetable Parchment Comes into the Kitchen.** Paterson Parchment Paper Co., Passaic, N. J. Free.

A pamphlet explaining many household uses of this product, with notes on how it is made.

**Why Soap Cleans Clean.** Armour and Co., Chicago, Ill. Free.

"The Story of Soap," its manufacture and chemical action. Illustrated.

## HOMEMADE AND HOME-GROWN

**Corona Garden Guide.** Corona Chemical Co., Milwaukee, Wisc. Free.

Lists of garden vegetables and flowers; time to plant; destruction of insect pests, etc.

**Poultry Aids.** Acetol Products, Inc., 21 Spruce St., New York City. Free.

Explains the importance of ultra-violet rays. Also a poultry house booklet

**Incubator Don'ts.** Cyphers Incubator Co., Buffalo, N. Y. Free.

This and other descriptive leaflets give practical suggestion on the hatching of chicks.

**Making Things.** International Harvester Co., 606 South Michigan Ave., Chicago, Ill. Free to teachers. 2c.

Excellent suggestions for the high school teacher of agriculture. Also leaflet, "Some Useful Things You Should Know How to Do."

**Manganese Deficiency in Soils and Fertilizers.** Carus Chemical Co., LaSalle, Ill. Free.

A 16-page pamphlet, describing a number of experiments showing that manganese is indispensable to the growth of many plants.

**Planting Your Bulbs.** Bulletin No. 31. American Nature Association, 1214 Sixteenth St., N.W., Washington, D. C. Free.

Illustrations and helpful hints on how and when to plant the different kinds of bulbs.

**Plant Your Own Trees.** Living Tree Guild, 468 Fourth Ave., New York City. Free.

Instructions on planting and caring for trees, shrubs, perennials, etc., with price lists.

**Teacher's Manual of Home and School Gardening.** The Children's Flower Mission, 5700 Detroit Ave., Cleveland, Ohio. Free.

Suggestions and price list of seed packets.

**Tree Planting Book.** The American Tree Association, 1214 Sixteenth St., N.W., Washington, D. C. Free.

Instructions on how to plant trees; lists of trees suitable for different regions of the United States; Arbor Day programs, etc.

**When Your Trees Need the Tree Surgeon.** Davey Tree Expert Co., 905 Elm St., Kent, Ohio. Free.

Lists and explains a number of serious tree troubles of common occurrence.

### SAFETY

**Safety for More and Better Adventures.** Albert W. Whitney. National Safety Council, 108 East Ohio St., Chicago. Free.

An address which proposes this as a better slogan than "Safety First," and that safety is living a purposeful life of high adventure. Many other excellent pamphlets are available: "Safety Slogans," "Safety on the Farm," "Relation of the Safety Movement to Education," "Safety Education in the High School," and "You and Your Car." Also, "Accident Facts, 1928"; recent, many tables and graphs.

**Correct Protection Against Fire.** Foamite-Childs Corp., Turner St., Utica, N. Y. Free.

Illustrated. Simple directions. Chart of types of fire extinguishers. Other booklets.

**Fire Prevention Week Handbook.** National Fire Protection Association, 40 Central St., Boston, Mass. 15c.

A good section on exhibits and posters. List of references. Home inspection blank very good. Other literature also supplied free.

**Safeguarding the Home Against Fire.** The National Board of Underwriters, 85 John St., New York City. Free.

Detailed information on fire hazards and the best means of prevention. Also "Safeguarding the Farm Against Fire."

### The Weather

**Jewels of Winter Storms Caught by the Camera.** William A. Bentley. New York Times Magazine, Sunday, March 6, 1927. Consult library files.

Gives exceptional photographs of snowflakes. Write to the author at Jericho, Vermont, for information about copies of these photographs.

**Series of Books for Amateur Weather Forecasters.** By P. R. Jameson. The Taylor Instrument Co., Rochester, N. Y.

Seven booklets:

- "Practical Hints for Amateur Forecasters." 15c.
- "Humidity, Its Effect on Our Health and Comfort." 15c.
- "The Mountains of Cloudland and Rainfall." 15c.
- "The Thermometer and Its Family Tree." 15c.
- "The Barometer as the Foot-Rule of the Air." 15c.
- "The Compass, the Signpost of the World." 15c.
- "Weather and Weather Instruments." 65c.

All illustrated. Excellent tables and scales. Useful for classes in general science, physical geography, physics, etc. The last one listed is a summary of the other six.

**The Work of the Weather Bureau.** Weather Bureau, Washington, D. C. Free.

An educational series describing cloud forms, twelve half-tone plates, wind barometer table; Weather Bureau, descriptive pamphlet; explanation of the weather map, leaflet; sample of daily weather map. One set is sent free to principals and teachers only. Additional sets for class use, 10c.; order from Superintendent of Documents, Washington, D. C.

**A Year of Stars.** The Youth's Companion, Perry Mason Co., Boston, Mass. 10c.

A star map for each month, with directions for use. The twelve maps, bound together in a booklet.

### Transportation

**How the World Rides.** Bulletin 1926, No. 8. U. S. Bureau of Education. Superintendent of Documents, Washington, D. C. 25c.

A historical survey of transportation. A great number of interesting facts are assembled here.

**Asphalt, a World-Old Material.** The Asphalt Association, 441 Lexington Ave., New York City. Free.

This Brochure No. 2 gives interesting historical data concerning the nature of asphalt, and its uses.

**Permanent Road Improvement.** National Highways Association, Washington, D. C. Free.

Statistics and pictures on national highways in France and the United States. Also, "The High Cost of Living as Related to Good Roads," etc.



**The Relation of Improved Highways to Home Life.** Highway Education Board, Washington, D. C. Free.

Reprint of essays written by high school pupils in a prize contest.

**Modern Cars and Locomotives.** Pennsylvania Railroad, Broad Street Station, Philadelphia, Pa. Free.

Consists chiefly of illustrations. Other booklets obtainable.

**Catskill Water Supply.** Board of Water Supply, New York City. 1926. Free.

A general description, with pictures, charts, and map. Also, "The Municipal Water Supply System" and "Facts and Regulations for Consumers of Water."

**Great Lakes-St. Lawrence Deep Waterway.** Bulletin No. 204. North Dakota Agricultural College, Fargo, N. D. Free.

Illustrations, graphs, and tables help tell what such a canal might mean to this state

**Study of St. Lawrence Waterway Project.** Fuel-Power-Transportation Educational Foundation, 1014 Hartman Bldg., Columbus, Ohio. Free.

A 32-page booklet, describing the general features of the project and various effects and aspects of the scheme. Will provide enough for each student.

**The New York State Canal System.** Division of Canals and Waterways, State Department of Public Works, Albany, N. Y. Free.

Descriptions, illustrations, map, and tables of statistics.

**Routes and Rates to World Markets.** Great Lakes-St. Lawrence Tidewater Association, 521 Munsey Bldg., Washington, D. C. Bulletin No. 33. Free.

This and other bulletins of this organization present the case for the benefit to the farmer of the proposed waterway.

**St. Mary's Ship Canal.** Civic and Commercial Association, Sault Ste. Marie, Mich. Free.

History and present use, with graphs and tables, showing tonnage of cargoes and many other interesting facts.

**Water Power in New York State.** The Empire State Gas and Electric Association, Grand Central Terminal, New York City. Free.

What its development will mean for the public A presentation of one of the big issues in present-day life.

### Raw Materials to Finished Products

#### THE CEREALS

**Grain Through the Ages.** School Health Service, The Quaker Oats Co., Chicago, Ill. Free.

An outline of the history of wheat, flax, and oats. A more juvenile booklet, but remarkably interesting, is "Hob O' the Mill." Enough supplied for one class. A recent booklet for nutrition experts is "What Science Says About Oats and Other Cereals."

**The Story of Bread.** Agricultural Extension Dept., International Harvester Co., 606 South Michigan Ave., Chicago, Ill. 5c.

"A story more than 50 centuries long." Illustrated. One of a number of very interesting publications.

**The Story of Flour.** The Pillsbury Flour Mills Co., Minneapolis, Minn. Free.

A leatherette brochure with a picture on each page and a pithy explanation. Views of wheat fields, harvesting scenes, and flour mills.

**The Story of Occident.** The Russell-Miller Milling Co., Minneapolis, Minn. Free.

An illustrated trip through a flour mill, introduced by a history of bread baking.

**The Story of Wheat.** A. Flanagan Co., Chicago, Ill. 10c.

Along with "The Story of Coal," "The Story of Sugar," etc., this brief history belongs to "The Little Classics Series" of interesting booklets.

**The Story of Wheat from Seed to Flour.** Washburn-Crosby Co., Minneapolis, Minn. Free.

A story told almost entirely with good-sized pictures, showing the grain, the machinery used in the various processes, and the products.

**Wheat.** Albers Bros. Milling Co., Davis and Vallejo Sts., San Francisco, Calif. Free, to teachers in Pacific Coast and Rocky Mountain states.

A small booklet with concise information on the history of wheat, its varieties, milling, etc., with a map showing world trade routes of wheat, and diagrams of a mill and of a wheat kernel.

**Wheat to Flour.** King Midas Mill Co., Minneapolis, Minn. Free.

Excellent illustrations show the principal types of wheat, accompanied by distribution maps.

**The Manufacture of Macaroni.** Beech-Nut Packing Co., Canajoharie, N. Y. Free.

The description of an interesting process. Illustrations show the successive stages and the machines used.

**A Trip Through Postumville.** Postum Cereal Co., Battle Creek, Mich. Free.

Mostly pictures, including reproductions of paintings which hang in offices and corridors of the administration building of the plant. Manufacturing processes and machinery interestingly explained.

**The Story of a Grain of Corn.** Associated Corn Products Manufacturers, 208 South LaSalle St., Chicago, Ill. Free.

The parts of a corn grain, the products made from them, and pictures of the machinery for the various processes of manufacture. Also other booklets.

**Rice.** Traffic Dept., Southern Pacific Lines, New Orleans, La. Free.

A brief discussion of this crop in the United States and "a hundred ways to prepare it." One map. Many other booklets obtainable.

#### OTHER FOODS

**Certified.** Sheffield Farms Co., 524 West 57th St., New York City. Free.

Views of a modern dairy. Enough copies will be provided to supply each pupil.

**The Story of Carnation Milk.** Carnation Milk Products Co., Oconomowoc, Wisc. Free.

A leaflet which describes the process of manufacturing evaporated milk. Recipes also given.

**The What, How, and Why of Condensed Milk.** Borden's Condensed Milk Co., New York City. Free.

An illustrated "trip" through a condensery. May be used for an imaginary trip or as a guidebook during a visit.

**The Romance of Cheese.** Kraft Cheese Co., 400 Rush St., Chicago, Ill. Free.

Illustrated. Describes many well-known varieties of cheese. Supplied in quantities.

**The Meat Packing Industry.** Swift and Co., Union Stock Yards, Chicago, Ill. Free.

Excellent illustrations of stock yards and packing house. Also "Little Journeys Through the Plants of Swift & Co."

**"The Story of the 57."** H. J. Heinz Co., Pittsburgh, Pa. Free, up to 35 copies.

Fully illustrated description of processes of preserving foods.

**The Story of Sugar.** American Sugar Refining Co., 117 Wall St., New York City. Free.

Illustrated. From plantation through factory. The principal supply for America's sweet tooth.

**The Story of Sugar.** California-Hawaiian Sugar Refining Co., Matson Bldg., San Francisco, Calif. Free.

Gathering sugar cane and refining the sugar. Illustrated.

**And Daily They Come.** Franklin Baker Co., Philadelphia, Pa. Free to teachers.

An illustrated booklet about cocoanuts, how they are grown, shipped, and used.

**The Romance of the Date.** Hills Brothers, Beach and Washington Sts., New York City. Free.

"This booklet treats of the place of dates in history, botany, and in the life of the human race." Good illustrations and a map of Mesopotamia. Also "Dates in the Healthful Diet." Free.

**The Story of the Banana.** United Fruit Co., Boston, Mass. Free.

A series of publications on the fruit—growth, food value, etc.

**The Story of Dried Fruits.** Sunland Sales Coöperative Association, Fresno, Calif. Free.

Raisins, figs, etc. Also "The Story of Ice Cream," in "Sunland Cookery" for March, 1928.

**The Story of Chocolate and Cocoa.** Hershey Chocolate Co., Hershey, Pa. Free for classroom distribution.

The beans from pods that grow only on the trunk and main branches of the cacao tree, and what becomes of them. Other booklets available. Write first for order blank.

**Coffee.** Hills Bros., 2 Harrison St., San Francisco, Calif. Free.

How coffee is grown and how to use it. Pictures and a map. One for each pupil supplied.

**The Romance of Coffee.** Chase and Sanborn, Boston, Mass. Free.

This and "Tea: Where and How It Grows" are illustrated booklets, giving information concerning these tropical plants.

**Coffee.** Commodities of Commerce Series No. 17. Pan-American Union, Washington, D. C. 5c.

A well-illustrated history and description of this important crop—a plant introduced into this hemisphere some two hundred years ago.

**A Leaf from the Orient.** Pneumatic Scale Corp., Norfolk Downs, Mass., and Joseph Tetley and Co., 483 Greenwich St., New York City. Free.

The story of tea and its uses. Describes in detail some of the machines used in treating this product.

**Spices: A Textbook for Teachers.** Home Economics Department, McCormick and Co., Baltimore, Md. Free.

A geographical and botanical dictionary of the spices, with colored plates of the plants and pictures of the machinery used in their preparation. Additional booklets are well illustrated: "Story of Extracts," "Tea, Its Culture," "The Story of Spices," etc.

**The Story of Vanilla.** Livermore and Knight Co., Boston, Mass., or 25 West 43rd St, New York City. Free.

The discovery and introduction of this flavoring extract and its present cultivation are described.

**Behind the Scenes in Candy Factories.** 1928. The Consumers' League of New York, 289 Fourth Ave., New York City. Annual membership, \$2.00.

Manufacturing processes and sanitary and working conditions in this industry.

#### FIBERS AND FABRICS

**The Romance of Pepperell.** Pepperell Manufacturing Co., Biddeford, Maine. Free.

Illustrated with views of spinning in colonial times and the interior of a modern mill.

**The Clothing of the People.** Cleveland Worsted Mills Co., Cleveland, Ohio. Free.

A description of the processes "from fleece to fabric." Many illustrations of the factories, machinery, raw materials, and finished products.

**From Wool to Cloth.** American Woolen Co., Andover, Mass. Free.

A well-illustrated, thirty-page booklet describing this animal fiber and its many uses.

**Sheep's Wool to Paderewski.** American Felt Co., 211 Congress St., Boston, Mass. Free.

Tells how felt is made and its many uses.

**A Story of Wool.** North Star Woolen Mill Co., Minneapolis, Minn.; 42 East 32nd St., New York City; 223 West Jackson Blvd., Chicago, Ill. Free.

A description of the manufacture and care of woolen blankets. Consists chiefly of illustrations.

**Linen Threads and Twines.** Barbour Products Co., 96 Franklin St., New York City. Free.

An illustrated story of the raising of flax and the processes of making linen.

**The Legend of Silk.** Realsilk Hosiery Mills, Indianapolis, Ind. Free.

The Chinese folk tale which dates the first use of silk as 4500 years ago, with the history of its introduction into Europe, and a description of modern methods of culture and manufacture.

**The Romantic Story of Silk.** Silk Association of America, 468 Fourth Ave., New York City. Free.

Good pictures of the life history of the moth that produces and of the machines that weave "the strongest fiber known to man," with an interesting narrative.

**The Story of Silk.** Cheney Brothers, Fourth Ave. at 18th St., New York City. Free.

. The culture of the silkworm, and the weaving of the fabric.

**Silk: Its Origin, Culture and Manufacture.** Corticelli Silk Mills, Florence, Mass. 10c.

Beautiful pictures are shown in this booklet along with clear description.

**From Worm to Wearer.** H. K. H. Silk Co., 120 East 16th St., New York City. Free.

Illustrated description of the silk industry.

**The Story of Rope.** Plymouth Cordage Co., North Plymouth, Mass. Free.

Well illustrated. Good materials for topic on economic plants. Also, "Useful Knots and How to Tie Them" and "How to Take Care of Rope."

#### MISCELLANEOUS

**How Leather Is Tanned.** Pfister and Vogel Leather Co., Milwaukee, Wisc., and Cheboygan, Mich. Free.

Gives a history of tanning and description of the processes in the manufacture of leather.

**The Romance of Leather.** American Leather Producers, 1 Park Ave., New York City. Free.

A brief history of leather, its importance to mankind and a description of tanning. Illustrated.

**The Romance of Rubber.** United States Rubber Co., 1790 Broadway, New York City. Free.

An illustrated historical outline. Supplied in numbers sufficient for each pupil.

**Wonder Book of Rubber.** B. F. Goodrich Rubber Co., Akron, Ohio, or 1780 Broadway, New York City. Branch offices in every part of the country. Free.

"A trip through Rubberland" from latex (sap) to its many products. Enough for one class will be provided.

**The Story of Shellac.** William Zinsser and Co., 516 West 59th St., New York City. Free.

This, with other booklets, tells of this product of oriental insects and its uses.

**The Shoe in Romance and History.** United Shoe Machinery Co., Boston, Mass. Free.

A beautifully illustrated brochure, showing many strange forms of shoes.

**The Story of Wood.** National Lumber Manufacturers Association, 702 Transportation Bldg., Washington, D C. Free.

Birch-bark design cover and good illustrations help tell an interesting tale.

**From Mastodon to Motor.** The Asphalt Association, 441 Lexington Ave., New York City. Free.

Reprint of an article from "World's Work." This booklet emphasizes the great age of asphalt. One copy to a class.

**The Wonderland of Trinidad.** The Barber Asphalt Co., 1600 Arch St., Philadelphia, Pa. Also offices in New York City, Chicago, Pittsburgh, Kansas City, St. Louis, San Francisco. Free.

Description and many illustrations of one of the natural sources of asphalt.

**From the Far Corners of the Earth.** Western Electric Co., 195 Broadway, New York City. Free, for each member of class.

The story of the rubber, the fibers, and the metals used in manufacturing telephones. Many illustrations and a map.

**McCormick Works.** International Harvester Co., 606 South Michigan Avenue, Chicago, Ill. Free.

A well-illustrated guidebook to these factories of farm implements.



**Electric Mining Machinery.** Goodman Manufacturing Co., Halsted St. and 48th Pl., Chicago, Ill. Free.

This and other bulletins have good coal-mine pictures. Bulletins No. 101, 301, 401, 501, 701, etc.

**The Making of a Great Newspaper.** The New York Times, New York City. Free.

A fully illustrated story of the many phases of newspaper publishing. A "Style Book" may also be obtained free.

**The Romance of the Match.** Diamond Match Co., 30 Church St., New York City. Free.

A beautiful brochure with the illustrated story of the use of fire by mankind.

**From Mine to Modern Kitchen.** The Aluminum Cooking Utensil Co., New Kensington, Pa. Free.

The story of the manufacture of Wear-Ever aluminum cooking utensils.

**The Precious Metal of the Kitchen.** Aluminum Wares Association, 844 Rush St., Chicago. Free.

Description of the manufacture of aluminum cooking utensils, with suggestions as to their care. Also a larger booklet, "Aluminum and Aluminum Ware."

**Little Pictures of a Big Industry.** Vermont Marble Co., Proctor, Vt. Free.

A booklet of views of marble quarries.

## Health

### GENERAL

**Health Material in Science Textbooks.** Lois M. Meier. Bureau of Publications, Teachers College, Columbia University. New York City. \$1.25.

An analysis of high school textbooks in general science, biology, chemistry, and physics as to their health content.

**How to Live Long.** Metropolitan Life Insurance Co., 1 Madison Ave., New York City. Free.

An elaboration of Fourteen Health Rules. Also, "An Ounce of Prevention," and many other pamphlets.

**The Human Machine.** Funk and Wagnalls Co., 354 Fourth Ave., New York City. 35c.

Simple explanations of how the body functions. By Wm. H. Howell of Johns Hopkins University. One of the National Health Council Series.

**Report: Committee on Public Health Relations.** 1926. The New York Academy of Medicine, Fifth Ave. and 103rd St., New York City. Limited supply.

Gives a review of health work in schools and of experiments in preventing certain communicable diseases.

**The Ultimate Mission of Chemistry.** Chas. H. Herty. The Chemical Foundation, 85 Beaver St., New York City. Free.

This mission is good health. Emphasizes the importance of research and favors a National Institute of Health.

**Happy's Vanity Case—and You.** American Child Health Association, 370 Seventh Ave., New York City. 5c.

For the adolescent girl: nature's cosmetics and how to use them.

**Lemon, The Natural Cosmetic.** California Fruit Growers Exchange, Los Angeles, Calif. Free.

Explains many uses of this citrus fruit. Also contains pictures of "movie" stars.

**My Health Book.** American Child Health Association. 370 Seventh Ave., New York City. 10c.

Practical health advice for the adolescent girl; contains a "health and beauty score card." Many other booklets of various prices. "The Wisdom of Professor Happy." Contains clever epigrams. 10c.

**How to Build Sound Teeth.** The American Dental Association, 58 East Washington St., Chicago, Ill. Free.

Information for teachers and parents.

**The Health Heroes Series.** Metropolitan Life Insurance Co., 1 Madison Avenue, New York City. Free.

Supplied five copies each for each science teacher and "An Outline for Teachers." Brief biographies of Pasteur, Jenner, Walter Reed, and Trudeau.

**Louis Pasteur.** Morris Fishbein. Haldeman-Julius Co., Girard, Kans. 5c.

Little Blue Book No. 680. A brief biography.

**The Great American Fraud.** By S. H. Adams. American Medical Association, 535 North Dearborn St., Chicago, Ill. 25c.

Detailed exposures of the methods of "patent medicine" quacks and the harm they do the public. Testimonials are sold and rented at so much a hundred.

**Chicago Health Education Conference.** American Child Health Association, 370 Seventh Ave., New York City. 338 pp. \$1.00.

Suggests health education problems which need investigation, instruction, study, or research. Contents: The Health Program in Secondary Schools; Teacher Training for Health Education; Materials for Health Education; Health Education Measurements.

**Health Trends in Secondary Education.** American Child Health Association, 370 Seventh Ave., New York City. 147 pp. \$1.00.

An analysis of the health programs in fifty-three schools including: Plan of Coordination; The Health Examination and Its Uses; Health Promotion and Health Training for Teachers; The Use of Hygienic Facilities; Basic, Specific, and Contributory Subject Matter; Physical Training; Home Economics; Mental and Social Health; Checking Up on Results; Building a Health Program.

**Benefits of Prohibition.** Pamphlet No. 3. The Prohibition Educational Leagues, Room 1705, 1440 Broadway, New York City. 2c.

A leaflet on economics and health; questions answered by quotations from many sources. Also other pamphlets.

**What Scientists Find Cigaretts Do.** Anti-Cigaret Alliance of America, Xenia, Ohio. Free.

A leaflet describing the effects that smoking has upon the child.

#### PROPER DIET

**Eating for Efficiency.** Evaporated Milk Association, 231 South LaSalle St., Chicago, Ill. Free.

Elaborate calorie tables and menus. Other free publications, including "Food for Camping Appetites."

**Every Child's Dietary.** National Federation of Day Nurseries, Room 907, 105 East 22nd St., New York City. 25c.

Health hints and recipes for use by teachers, nurses, and parents.

**Food: Why? What? How?** The American National Red Cross, Washington, D. C. Free.

The classes of foods, factors influencing food requirements, suggestions on choosing foods. Tables of food values and of height-weight are included.

**The Needs of the Body.** Research Dept., Calumet Baking Powder Co., Chicago, Ill. Free.

A small booklet discussing the rôle of aluminum compounds in our diet.

**Nutrition and Health.** Borden Co., 350 Madison Ave., New York City. Free to teachers.

Malnutrition: its causes, symptoms, and prevention. Many posters, cartoons, and tables are reproduced therein.

**A Program for Teaching Health Habits.** Cream of Wheat Co., Minneapolis, Minn. Free.

This booklet gives lesson plans for topics on proper diet, rest and sleep, hygiene of the teeth, cleanliness; and a bibliography.

**The School Lunch.** Educational Dept., Postum Co., Battle Creek, Mich. Free.

The food needs of the body, with menus. This small booklet includes good suggestions on diet.

**Telling Fortunes with Foods.** California Fruit Growers Exchange, Box 530, Station C, Los Angeles, Calif. Free.

Urging the value of citrus fruits in the diet for their vitamin value and for preventing acidosis. Many other worthwhile bulletins and pamphlets.

**What to Eat.** Prudential Insurance Co., Newark, N. J. Free.

Facts about foods. Also height-weight tables. Many other excellent booklets as, "Health Through Exercise," "Strong Bodies," "Cancer Pointers," and "Consumption."

**Why We Refrigerate Foods.** Ice Publicity Association, 18 East 41st St., New York City. Free.

Facts and suggestions on the care of foods. Also other bulletins about the use and care of refrigerators.

**Your Children's Food.** The Calumet Baking Powder Co., 4100 Fillmore St., Chicago, Ill. Free to teachers.

Deals with the necessary types of foods to secure a child's growth. Suggestions for meals and tables of the nutritive content of various foods.

**All About Milk.** Metropolitan Life Insurance Co., 1 Madison Ave., New York City. Free.

Lives up to its title very well. Some of the topics discussed are Care of Milk, Milk Products, Vitamins, and Composition of the "best all-round food."

**The King of Foods.** Sheffield Farms Co., 524 West 57th St., New York City. Free.

A leaflet comparing the composition of various common foods and emphasizing the importance of milk.

**Klim Facts.** Merrell-Soule Co., Syracuse, N. Y. Free.

The manufacture and uses of powdered milk. Well illustrated. Another booklet, "Your Child's Health," especially for parents, contains diet tables and a good bibliography.

**Milk for Sound Teeth.** Borden Farm Products Co., 110 Hudson St., New York City. Free.

Pictures and facts concerning the lime in milk. Other free publications about milk.

**Baking Powders: Classification and Ingredients.** Educational Dept., Royal Baking Powder Co., 100 East 42nd St., New York City. Free.

Applied chemistry. Many other pamphlets, including "The School Lunch Box" and cook books in several languages.

**The Truth About Food Fads.** American Institute of Baking, Chicago, Ill. Free.

This and other booklets discuss the food value of breadstuffs. Interesting materials.

**Bread and Its Ingredients.** Fleischmann Co., 689 Washington St., New York City. Free to teachers only.

Contains excellent, reproducible charts and diagrams along with discussion of this topic.

**Health from the Whole Wheat.** Shredded Wheat Co., Niagara Falls, N. Y. Free.

Simple explanations of the meaning of health, the need of "roughage," the importance of chewing, etc., together with recipes. Chart and samples may also be obtained.

**Yeast for Health.** Northwestern Yeast Co., 1750 North Ashland Ave., Chicago, Ill. Free.

Reports of experiments on using yeast in the diet are contained in this booklet.

**The Economics of Vitamines.** Bulletin No. 11. Institute of Margarine Manufacturers, 1049 Munsey Bldg., Washington, D. C. Free.

Many important facts about all the vitamins are included in this booklet. One will be supplied for each pupil. Other materials also are available from this office.

**Vitamins.** Ralston Purina Co., 8th and Gratiot Sts., St. Louis, Mo. Free.

Other booklets are also available.

**Vitamins in Canned Goods.** Bulletin No. 19-L. National Canners Association, 1739 H St., N. W., Washington, D. C. Free.

Extensive tables of data, bibliography, and list of publications of this organization. Many other informational booklets, including "Nutritive Value of Canned Foods," "Canned Fruits," "Canned Corn," "Canned Tomatoes," and "Food Poisoning."

**The Dietetic Advantage of a Digestible Cooking Fat.** Procter and Gamble, Cincinnati, Ohio. Free.

Discusses food values and the chemical process of hydrogenation.

**Meat—Its Selection and Preparation.** Institute of American Meat Packers, 509 South Wabash Ave., Chicago, Ill. Free.

A 30-page pamphlet, illustrated, giving information on cuts of beef, pork, mutton, and other meats.

#### CAUSES AND PREVENTION OF DISEASE

**Bacterins.** Abbott Laboratories, North Chicago, Ill. Free.

This leaflet explains the various kinds of vaccines that are used. Other leaflets also available on specific antiseptics and other similar preparations.

**A Book with a Mission.** Johnson and Johnson, New Brunswick, N. J. Free to teachers.

Gives concise information about communicable diseases and how to control them. Also series of Contagious Disease Bulletins:

No. 28—"Diphtheria and Scarlet Fever."

No. 29—"Typhoid Fever and Allied Diseases."

No. 38—"Infantile Paralysis and Cerebro-Spinal Fever (Meningitis)."

No. 40—"Whooping Cough and Measles."

No. 56—"Consumption."

No. 57—"Smallpox."

No. 58—"Influenza, Pneumonia, and Common Colds,"

and others on First Aid.

**The Control of Communicable Diseases.** American Public Health Association, 370 Seventh Ave., New York City. Free to teachers.

Succinct facts about most of the infectious diseases.

**The Common Diseases of Children.** Prudential Life Insurance Co., Newark, N. J. Free.

A handy booklet on measles, diphtheria, etc., which gives facts concerning their cause.

**Common Causes of Blindness in Children.** National Committee for the Prevention of Blindness, 370 Fifth Ave., New York City. Free.

Discusses injuries, contagions, and eyestrain, with means of preventing blindness. Illustrated. Also many other pamphlets.

**Prevention and Treatment of Diphtheria.** Lederle Laboratories, 511 Fifth Ave, New York City. Free.

Facts about the Schick test Booklets on other antitoxins sent on request.

**The Conquest of Typhoid Fever.** Metropolitan Life Insurance Co., 1 Madison Ave., New York City. Free, 5 copies for each teacher.

Causes and prevention. Many other booklets on communicable diseases, such as "Diphtheria," "Malaria," "Measles," "Common Colds," "Smallpox," and "Whooping-Cough." The one on "Diphtheria" supplied for each pupil.

**Get the Fly.** International Harvester Co., Harvester Bldg., Chicago, Ill. Free.

This leaflet contains facts, suggestions, and charts, which may readily be copied. Separate sheet of plans for building fly traps.

**Keep Well Leaflets.** Life Extension Institute, 25 West 43rd St., New York City. 6 for 25c; complete set of 37, \$1.25.

This set of instructive leaflets includes such titles as "Care of the Eyes," "Prevention of Colds," "Focal Infection," "Protecting the Lungs," "Headaches," and "Table of Energy Value of Food." They emphasize physical upbuilding and the prevention of disease, with specific instructions and suggestions. Send for complete list of titles.

**Our Common Diseases and the Germs That Cause Them.** General Biological Supply House, 761 East 69th Pl., Chicago, Ill. 50c.

A number in the "Turtox Library."

**Smallpox and Vaccination.** Bulletin No. 1137. Johnson and Johnson, New Brunswick, N. J. Free.

Besides authoritative facts, this booklet contains many interesting pictures of Jenner, his birthplace, laboratory, instruments, and a reproduction of the painting of the first vaccination.

**The Menace of Smallpox.** H. K. Mulford Co., Philadelphia, Pa. Free.

Important facts about this disease and its prevention. Illustrated from photographs. Also "Smallpox Vaccine."

**Menace of the Unvaccinated.** Rockefeller Foundation, 61 Broadway, New York City. Free.

Statistical reports on unvaccinated persons, and the significance of the facts cited, which anti-vaccinationists fail to consider. Emphasizes social responsibility of all. Reprint from the Journal of the American Medical Association.

**Smallpox Is Preventable.** American Association for Medical Progress, 370 Seventh Ave., New York City. Sample copy free.

Jenner's discovery and statistics concerning its results. A list of recent outbreaks of smallpox in American cities. Bibliography. Booklets on other diseases, as "Rabies" and "Diphtheria"; also "The Economics of Health."



**Smallpox in the United States.** Benjamin C. Gruenberg. American Association for Medical Progress, 370 Seventh Ave., New York City. Sample copy free.

Reprinted from the "Trained Nurse and Hospital Review," Vol. 80: 533-538. Gives the latest statistical evidence on the value of vaccination.

**What You Should Know About Tuberculosis.** National Tuberculosis Association, 370 Seventh Ave., New York City. Free to teachers.

Cause, prevention, and cure discussed in simple language. Illustrated.

**If You Were Bitten?** H. K. Mulford Co., Philadelphia, Pa. Free.

A small leaflet describing anti-snake-bite serums; how they are prepared and used.

**Heliotherapy.** Vitaglass Corp., 50 East 42nd St., New York City. Free.

"A synopsis of the recent literature with particular reference to rickets and tuberculosis," with bibliographies. Other free pamphlets include, "The Anti-Rachitic Efficiency of Winter Sunlight of Washington, D. C.," "Health Through Your Windows," etc.

**Rickets and Scurvy.** Metropolitan Life Insurance Co., 1 Madison Ave., New York City. Free.

Prevalence, causes, symptoms, and prevention: get vitamins and sunshine. Booklets on other deficiency diseases: "Pellagra," etc.

**Is Trachoma a Deficiency Disease?** B. Franklin Royer. American Medical Association, 535 North Dearborn St., Chicago, Ill. Free.

A discussion of eye diseases, especially in Kentucky. Rather technical; of value as reference material.

**Chemistry in Relation to Biology and Medicine.** J. J. Abel. The Chemical Foundation, 85 Beaver St., New York City. Free.

Discusses the hormones, especially insulin, and gives good historical background.

**Goiter.** Metropolitan Life Insurance Co., 1 Madison Ave., New York City. Free.

Describes this as the "easiest disease to prevent." Gives good advice. Other booklets on endocrine disturbances: "Diabetes," etc.

**Goiter.** Morton Salt Co., Chicago, Ill. Free.

Explains the why of iodized salt. Intended for popular information.

**Pluri-Glandular Insufficiency.** Reed and Carnrick, 155 Van Wagenen Ave., Jersey City, N. J. Free to teachers.

This and other booklets on internal secretions are intended for the medical profession and for graduate students of physiology. "Glandular Harmony" very good. Useful to teachers with these interests.

**The Mysterious 35 Feet.** Health Products Corp., 393 Seventh Ave., New York City. Free.

The human alimentary canal and the danger of constipation.

**Dyskinesia.** Metropolitan Life Insurance Co., 1 Madison Ave., New York City. Free.

A technical name for constipation, characterized as "the pet ailment of erring millions." Instruction on what to do about it.

**One of the First Questions Every Doctor Asks.** Home Economics Dept., The Kellogg Co., Battle Creek, Mich. Free, in sufficient number for each pupil.

Contains a good diagram of the human digestive organs. Discusses constipation, its causes and prevention. Other literature, including "Vacation Values," "Camp Menus," "Making the Team," and "Food Selection Chart."

**How Cancer Education Pays.** American Society for the Control of Cancer, 25 West 43rd St., New York City. Free.

A leaflet reporting results of work done in Pennsylvania. "Cancer 'Cures'" is another of the many informative pamphlets of this organization. Also "The New Idea of Cancer," "The Fear of Cancer," "The Prevention of Cancer," and "What Everyone Should Know About Cancer."

**Foot Health.** Geo. E. Keith Co., Campello, Brockton, Mass. Free.

Correct principles in footwear.

#### MENTAL HYGIENE

**What Is a Nervous Breakdown?** National Committee for Mental Hygiene, 370 Seventh Ave., New York City.

One of a number of booklets. Write for list and rates.

**Nervous and Mental Diseases.** Peacock Chemical Co., St. Louis, Mo. Free.

Contains good diagrams of the nervous system. Though somewhat technical, it is a good reference book.

#### FIRST AID

**Artificial Respiration.** National Safety Council, 108 East Ohio St., Chicago, Ill. Free.

An illustrated leaflet on the prone pressure method. "Don't wait for an accident. Practice on a friend. Let him practice on you."

**First Aid.** Prudential Insurance Co., Newark, N. J. Free.

Illustrated guidebook on bandaging and life-saving.

**First Aid in the Home.** Metropolitan Life Insurance Co., 1 Madison Ave., New York City. Free; 5 to each teacher.

Emphasizes prevention. Gives specific instructions. Illustrated.

**First-Aid-to-the-Injured Handbook.** Society for Instruction in First-Aid-to-the-Injured, 105 East 22nd St., New York City. Free to teachers of hygiene.

Quite complete, including instructions concerning common ailments as well as concerning injuries.

**Life-Saving Methods.** The American National Red Cross, Washington, D. C. Free.

Treats principally of learning to swim and rescuing from drowning.

**Scout Emergency Units.** Catalog No. 3279. Boy Scouts of America, 2 Park Ave., New York City. Free.

Directions for contests and requirements for First Aid Merit Badge.

**Home Book on Sanitation.** Merck and Co., 145 Front St., New York City. Free.

A booklet on the uses of disinfectants about the household and with domestic animals.

**What to Do for Ailments, Accidents, and Emergencies.** Norwich Pharmacal Co., Norwich, N. Y. Free.

This little booklet gives practical suggestions for the treatment of burns, poison ivy, blisters, etc. This company will also send small samples of some of its products.

## VENTILATION

**The Janitor and the School Child.** C. E. Winslow. Metropolitan Life Insurance Co., New York City. Free.

An authoritative discussion of the relation of ventilation to health. Illustrated with drawings and diagrams useful in studying air currents.

**Ventilation of School Buildings.** National Education Association, 120 16th St., N.W., Washington, D. C. 15c.

A small pamphlet of facts of use to teachers and administrators, also for pupil reference.

**Manufactured Weather.** Carrier Engineering Corp., 750 Frelinghuysen Ave., Newark, N. J. Free.

A booklet on artificial ventilation, written in understandable style.

**Temperature: Its Relation to Health and Comfort.** Taylor Instrument Co., Rochester, N. Y. Free.

Temperature and humidity as important health factors are discussed as well as the instruments for their measurement.

**The Effect of Moisture on Paper.** American Writing Paper Co., Holyoke, Mass. Free.

A study of the industrial importance of proper humidity.

## The Study of Living Things

## GENERAL

**The ABC of Biology.** Vanguard Press, 80 Fifth Ave., New York City. 50c.

One of several introductions to science subjects. This press also publishes abridged editions of many of the classics of science, such as Darwin's "Descent of Man" and Draper's "History of the Conflict Between Religion and Science."

**Facts You Should Know About Animal Life.** No. 227. Haldeman-Julius Co., Girard, Kans. 5c.

One of many science numbers in the "Little Blue Book Series." Its sixty-two pages have many clear line drawings and give a rapid survey of the animal kingdom.

**Selections from Huxley.** Edited by C. Alphonso Smith. Henry Holt and Co., 1 Park Ave., New York City. 52c.

Among other things, this compact little volume contains that model of clear writing on a scientific subject, "On a Piece of Chalk." Every teacher and science student should be well acquainted with it.

**How the Plant Produces Seed.** Lesson No. 144, Farm Reading Course, April, 1919. College of Agriculture, Cornell University, Ithaca, N. Y. Free.

Excellent diagrams of flower and seed parts, with explanations of pollination and fertilization.

**Sorghum and Sugar Cane.** Crop Book Dept., Virginia-Carolina Chemical Co., Richmond, Va. Free.

An illustrated description of these plants and their culture. There are several other "crop books" in the series.

**Sweet Corn.** American Agricultural Chemical Co., 419 Fourth Ave., New York City. Free.

A leaflet on the use of fertilizers. Other crop booklets also available.

**Hitch More Science to the Plow.** Armour Fertilizer Works, Chicago, Ill. Free.

A booklet about foods for crops. Also, "Through a Modern Fertilizer Plant."

**Legume Germs.** The Nitragin Co., Milwaukee, Wisc. Free.

How nitrogen is captured from the air by the bacteria on the roots of legumes.

**Legume Inoculation.** Extension Bulletin No. 2, 1916. College of Agriculture, Cornell University, Ithaca, N. Y. Free.

Information both for the farmer and for the biology teacher concerning nitrogen-fixing bacteria.

**The Modern Aquarium.** Innes and Sons, 129 North 12th St., Philadelphia, Pa. 75c.

A beautifully illustrated handbook, which clearly explains the principles of aquarium management, equipment, plants and animals to keep, treatment of their ills, etc.

**Schoolroom Aquaria.** Prepared at The Lincoln School. Bureau of Publications, Teachers College, Columbia University, New York City. 25c.

Includes discussion of materials and teaching values, book lists, and the like.

**Starting and Maintaining Aquaria and Vivaria.** General Biological Supply House, 761 East 69th Place, Chicago, Ill. Free.

Gives valuable hints on how to keep living things in the classroom; the plants and animals that can be kept, and the equipment.

**Some Advice on the Home Aquarium.** Bulletin No. 29. American Nature Association, 1214 16th St., N.W., Washington, D. C. Free.

Written as a letter to a housekeeper. Well illustrated. Clear explanations of care of aquarium pets.

**A First Chapter in Natural History.** F. A. Lucas. American Museum of Natural History, 77th St. and Central Park West, New York City. 10c.

Includes a good drawing of the ameba and discussion of introductory lessons in the study of living things.

**The Common Laboratory Protozoa.** General Biological Supply House, 761 East 69th Pl., Chicago, Ill. \$1.00.

A very useful handbook with directions for maintaining laboratory cultures of protozoa. Illustrated.

**Guide to Fresh-Water Biology.** J. G. Needham. The American Viewpoint Society, 15 Astor Pl., New York City. \$1.00.

A handbook for field study of the many kinds of pond life.

**The Microscope.** E. Leitz, 60 East 10th St., New York City. Free to teachers.

An illustrated instruction booklet on the mechanical and optical construction of the microscope, with directions for its use and care.

**The Microscope.** Spencer Lens Co., Buffalo, N. Y. Free.

Diagrams, explanations, and suggestions on the construction, use, and care of a compound microscope, with a table of magnifications.

**Use and Care of the Microscope.** Bausch and Lomb Optical Co., Rochester, N. Y. Free.

Necessary information for a student who uses a microscope.

**The Evolution of the Horse in Nature and Under Domestication.** W. D. Mathew and S. H. Chubb. American Museum of Natural History, 77th St. and Central Park West, New York City. 20c.

Illustrated from specimens in the Museum, "describes the successive stages in its evolution from the four-toed 'Eohippus,' no bigger than a fox, to the single-toed horse of to-day."

**The Races of Domestic Fowl.** M. A. Jull. National Geographic Magazine, April, 1927. Hubbard Memorial Hall, Washington, D. C. 50c a copy.

For study of heredity. Descriptions and excellent pictures.

**Race Betterment.** Mary G. Peck. American Eugenics Society, 185 Church St., New Haven, Conn. Free.

An excellent outline of the history and meaning of eugenics

**A Eugenics Catechism.** American Eugenics Society, 185 Church St., New Haven, Conn. Free.

A worthy attempt to offset current misconceptions of the idea of eugenics. There is also a free pamphlet on the work of the American Eugenics Society.

#### BIRDS

**Bird Migration.** Bulletin No. 185, U. S. Department of Agriculture, Superintendent of Documents, Washington, D. C.

Though published in 1915, it contains many interesting facts about birds.

**Birds in Relation to Agriculture in New York.** Lesson No 76, Farm Reading Course. College of Agriculture, Cornell University, Ithaca, N. Y. Free.

**How to Teach About Birds.** G. P. Brown and Co., Beverly, Mass. 25c.

"An outline of the subject, a plan of study, and other valuable information. Topics: Parts of a bird, feathers, kinds of birds, nests, eggs, songs, bad birds, moulting modification of the bill, and migrations."

**A Manual of Bird Study.** Wm. H. Carr. School Service Series No. 1. Department of Public Education, American Museum of Natural History, 77th St. and Central Park West, New York City 1927. Free to teachers.

A description of twenty-five local birds, with study outlines and outline drawings.

**Nests and Eggs of Our Common Birds.** Howard Jones, Circleville, Ohio. Lezins-Hiles Co., Cleveland, Ohio. Write for price.

A key according to color of egg and location of nest.

**The New Method of Bird Study.** Inland Bird Banding Association, 124 Washington St., Waukegan, Ill. Free.

A leaflet describing an interesting method of coöperating with the U. S. Biological Survey.

**An Outline of Bird Study.** C. B. Coursen. General Biological Supply House, 761 East 69th Pl., Chicago, Ill. \$1.00.

Well-illustrated guide to the many phases of bird study. Check list for Chicago. Bibliography.

**A Plea for Our Hawks.** American Nature Association, Washington, D. C. 5c.

Interesting and valuable facts with which to show that not all hawks are bad, in fact that many of them are man's friends in their rôle of rodent destroyers.

**Save the Birds.** Dwinell-Wright Co., 311 Summer Ave., Boston, Mass.; 112 West Kinzie St., Chicago, Ill.; Duke and Chestnut Sts., Portsmouth, Va. Free.

Brief descriptions of 24 common birds of the United States with views of each in natural colors. Similar is "Common Wayside Flowers" which pictures and describes 45 common flowers.

**Your Bird Friends and How to Win Them.** Joseph H. Dodson, Kankakee, Ill. Free.

A booklet on the protection of useful birds, listing bird houses and other accessories.

#### BOTANY

**Botany.** Merit Badge Series Boy Scouts of America, 2 Park Ave., New York City. 20c.

In describing the requirements for this honor many important facts about plants and how to study them are explained. Sections on Botany as a Vocation; and a selected bibliography.

**Keys to the Flowering Plants.** W. N. Clute. Butler University, Indianapolis, Ind. 25c.

"Simple keys for recognizing the families with the minimum use of a lens." Useful reference.



## FORESTS

**The Big Tree and Its Story.** George H. Sherwood. American Museum of Natural History, 77th St. and Central Park West, New York City. 15c.

**Check List of Forest Trees of United States.** Miscellaneous Circular No. 92. U. S. Department of Agriculture, Washington, D. C. Free.

Short descriptions of trees. Useful for reference or field guide.

**Common Trees of New York.** The American Tree Association, 1214 16th St., N.W., Washington, D. C. Free to schools in New York.

Also: Common Trees of Indiana, New Jersey, Massachusetts, Michigan, and Ohio. Free to schools in respective states.

**Fifty Common Trees of New York.** Bulletin No. 26, December, 1927. College of Agriculture, Cornell University, Ithaca, N. Y. Free.

One-page description of each species, with illustration of leaf, fruit, and twig.

**Pocket Natural History.** Cleveland Museum of Natural History, Cleveland, Ohio. 15c each.

This series includes "Trees of Ohio," etc. Others are about Indians.

**The Forestry Primer.** The American Tree Association, 1214 16th St., N.W., Washington, D. C. Free, in quantities for class use.

A very widely distributed booklet with plain facts on the values of forests and the great danger from waste. Also "Forestry in the South."

**Forests and Floods.** Circular No. 19, January, 1928 U. S. Department of Agriculture, Washington, D. C. Free.

Gives accurate information on a well-known, though frequently misunderstood, topic.

**Our American Forests.** National Lumber Manufacturers Association, 702 Transportation Bldg., Washington, D. C. Free.

Forests, their extent, products, pests, and the methods of reforestation. Statistical tables. Illustrated. Also "National Lumber Handbook" and other literature.

**California White Pine.** Information Sheet No. 1. California White and Sugar Pine Manufacturers' Association, San Francisco, Calif. Free.

This and much other literature is exceptionally well done.

**Manual of Standard Wood Construction.** Southern Pine Association, New Orleans, La. \$1.50.

Specifications and tables. Very detailed. Useful in manual arts and shop work.

**Southern Pine Industry.** Southern Pine Association, New Orleans, La. Free.

Statistics and good graphs. Also many other good booklets.

#### INSECTS

**The Boll Weevil and How to Fight It.** Crop Book Dept., Virginia-Carolina Chemical Co., Box 1616, Richmond, Va. Free.

Contains many illustrations and much important information on this topic. It is one of several booklets obtainable from this company. "Orchards and Good Fruits," "Corn," "Vegetables and Truck Crops," "Peanuts," are among the others.

**How to Collect and Preserve Insects.** F. E. Lutz. American Museum of Natural History, 77th St. and Central Park West, New York City. 10c.

An illustrated handy reference and instruction booklet.

**Insect Life.** Merit Badge Series. Boy Scouts of America, 2 Park Ave., New York City. 240 pp. \$1.50.

Chapters on identification, collections, and life histories; also entomology as a career, and the like, with clear illustrations, tables, and good bibliography.

#### LIVESTOCK

**Progressive Sheep Raising.** Armour's Livestock Bureau, Union Stock Yards, Chicago, Ill. Free.

Many illustrations and interesting facts. Similar booklets: "Progressive Hog Raising," "Progressive Beef-Cattle Raising," "Progressive Poultry Raising," "Marketing Livestock and Meats," and "Handbook of Agriculture."

### Society's Challenge to Science

**The Cancer of Ignorance.** Chester H. Rowell. American Association for Medical Progress, 370 Seventh Ave., New York City. Sample copy free.

Describes the spread of Anti-Science in one American commonwealth. Reprint from "The Survey," November 1, 1925. Similar pamphlet, "The Attack on the Scientific Method," also available.

**Anti-Evolution Laws.** American Civil Liberties Union, 100 Fifth Ave., New York City. No 25. 10c.

A summary of the situation regarding these laws in the various states. Other numbers in their list of publications which deal with legislation affecting freedom of teaching are Nos. 27, 44, 45, 46.

**A Challenging Situation.** Science League of America, 509 Gillette Bldg., 830 Market St., San Francisco, Calif. Free.

This folder describes the work of the organization. "Organized to protect freedom of teaching and learning in our tax-supported schools." Membership \$3.00 a year.

**The Scientific Method.** Character Education Institution, Chevy Chase, Washington, D. C. Quantity orders from National Capital Press, Washington, D. C. 10 for 50c; 500, \$5.00.

Contains outlined sections on Description of the Method, Characteristics of the Scientist, Verification, Intellectual Immoralities, etc. A forceful corrective to fantastic thinking. This excellent little leaflet could well appear on the bulletin board of every school.

**A Century of Industrial Progress.** The American Institute, 250 West 57th St., New York City. Free.

A leaflet describing the book of this title. Motto: "Eternal research is the price of survival." A small anniversary pamphlet.

**Nature Play.** W. G. Vinal. Playground and Recreation Association of America, 315 Fourth Ave., New York City. 10c.

This and "The Nature Almanac"—25c—give nature facts, with suggestions for games and a community nature program. Good material. Ask for list of publications and list of posters.

**Needless Coal Mine Accidents.** American Association for Labor Legislation, 131 East 23rd St., New York City. 10c.

Gives facts and a program for prevention.

**What Price Progress.** Hugh Farrell. The Chemical Foundation, 85 Beaver St., New York City. Free.

The stake of the investor in the development of research, especially in chemistry. This is a pamphlet with the same title as that of a larger book.

**The Future Independence and Progress of American Medicine in the Age of Chemistry.** The Chemical Foundation, 85 Beaver St., New York City. Free.

A committee report on the great need of further research.

**How Science Helps Our Faith.** Shailer Mathews. American Institute of Sacred Literature, Hyde Park, Chicago, Ill. 3c.

Write for list of other booklets in the Religion and Science Series.

**Inspirational Aspects of Science.** Samuel S. Wyer, Hartman Bldg., Columbus, Ohio. Out of print—consult library files.

A discussion of why science is fundamental in education.

**Some Recent Opinions on Modern Vivisection.** American Association for Medical Progress, 370 Seventh Ave., New York City. Sample copy free.

Presents unsentimental opinions and enumerates the facts concerning definite achievements by animal experimentation, such as aseptic surgery, insulin, etc. Other pamphlets on the same topic:

No. 063—"Vivisection and Animal Welfare." Ernest Harold Baynes.

No. 060b—"Vivisection and Modern Miracles." Ernest Harold Baynes.

No. 140—"Jordan-Burbank Letters on Anti-Vivisection."

No. 170—"The Dog's Gift to the Relief of Human Suffering."

No. 190—"The Ethics of Animal Experimentation." John Dewey.

**Vivisection According to Representative People.** Vivisection Investigation League, Room 409, United Charities Bldg., 105 East 22nd St., New York City. Free.

Presenting one side of a much-debated question.

**PAMPHLETS**

**General Science and Biology.** (List other materials in space below.)

## C. CHEMISTRY

### General

**Chemistry.** Boy Scouts of America, 2 Park Ave., New York City. 20c.

22 pages. Describes a number of projects and the possibilities of chemistry as a profession. Includes possible cost of college courses.

**Chemistry.** Chas. H. Herty. The Chemical Foundation, 85 Beaver St., New York City. Free.

A leaflet on the contributions of chemistry to the many fields of modern industry.

**The Fifth Estate.** Arthur D. Little. The Chemical Foundation, 85 Beaver St., New York City. Free.

An address on the place of science in civilization.

**Directory of Commercial Minerals.** Central of Georgia Railway, Savannah, Ga. Free to teachers.

Illustrated. Many facts about the minerals in the states of Georgia and Alabama.

**Chemistry in the United States Department of Agriculture.** U. S. Department of Agriculture, Washington, D. C. Free

A small booklet of 36 pages, describing the rôle of chemistry in this department.

**Chemicals.** The Grasselli Chemical Co., 347 Madison Ave., New York City. Free.

A small 16-page catalog describing this company's many chemical products.

**Porter Chemical Co., Hagerstown, Md.** Booklets on different Chemcraft outfits. Free.

**The Handwriting on the Wall.** E. H. Sargent and Co., 155 East Superior St., Chicago, Ill. Free.

Reprint of an address by A. D. Little emphasizing the importance of scientific research, especially in chemistry.

**Materials for the Household.** U. S. Bureau of Standards Circular No. 70. Superintendent of Documents, Washington, D. C. 5c.

Describes paint, cement, plasters, fuels, etc.

**Leaves from the Notebook of the Chemists.** University of Pittsburgh, Pittsburgh, Pa. Free.

A 60-page pamphlet giving 8 radio talks on chemical subjects. Also, "The Role of Chemistry in Everyday Life"—two publications of this title, 15c and 60c; "Science in Industry," 60c; "Chemistry and Human Progress," 60c; and "Science in the Home," 75c.

### Aluminum

**The Story of Wear-Ever.** The Aluminum Cooking Utensil Co., New Kensington, Pa. Free.

A 24-page bulletin, telling the story of aluminum, from the mine to the kitchen.

### Calcium

**American Lime and Stone Co.,** Bellefonte, Pa. Free.

"Lime and Lime-Cement Brick Mortar," 11 pages describing use in construction. "Water-Tight Concrete," 28 pages showing how Hydrated Lime produces water-tight concrete. Also a number of other bulletins on the use of lime in agriculture and industry.

**Dowflake.** The Dow Chemical Co., Midland, Mich. Free.

A leather-covered booklet, containing four pamphlets aggregating about 100 pages, on the maintenance, construction, and care of roads. They involve the use of this company's calcium chloride to keep down dust and to preserve the road. Will also send "Calcium Chloride," an 18-page booklet, showing use, manufacture, and shipping.

**Set of Pamphlets.** National Lime Association, Washington, D. C. Free.

This set of pamphlets describes the use and properties of lime, as it is used in construction and as a fertilizer. The most valuable of the set are: "Better Concrete Roads" and "Cold Weather Mortar."

**Lime, Its Properties and Uses.** U. S. Bureau of Standards Circular No. 30. Superintendent of Documents, Washington, D. C.

**The Manufacture of Lime.** Standards Technologic Papers, No. 16, U. S. Bureau of Standards. Superintendent of Documents, Washington, D. C.

Good reference material.

### Carbon and Its Compounds

**Correct Protection Against Fire.** American LaFrance and Foamite Corp., Utica, N. Y. Free.

24 pages. The use of extinguishers and how Fire Foam protects. 150 copies furnished a school.

**The Wonderland of Trinidad.** The Barber Asphalt Co., 1600 Arch St., Philadelphia, Pa. Free.

19 pages. Many pictures showing the production of asphalt and the geographical location of the lake. Supplied to teachers and pupils interested.

**Carbon Tetrachloride.** The Dow Chemical Co., Midland, Mich. Free.

16 pages. Properties and use of this substance as a dry cleaner, fire extinguisher, and solvent.

**Making Dixon's Eldorado.** Joseph Dixon Crucible Co., Jersey City, N. J. Free.

8 pages. A small booklet describing the complete process of manufacture of pencils. Will probably send enough for each student.

**Lead Pencils.** Eberhard Faber, 37 Greenpoint Ave., Brooklyn, N. Y. Free.

36 pages. History of the industry and how pencils are made.

**A Wonder Book of Rubber.** B. F. Goodrich Rubber Co., Akron, Ohio. Free.

47 pages, illustrated. Describes the process of gathering and curing rubber, and the manufacture of rubber goods.

**The Story of Rubber.** Hood Rubber Co., Watertown, Mass. Free.

37 pages. A well-illustrated little book describing the complete process of the manufacture of rubber goods.



**The Romance of Rubber.** U. S. Rubber Co., 1790 Broadway, New York City. Free.

24 pages, many illustrations. Booklet by John Martin (of John Martin's Book) telling in an interesting way the story of rubber. Gives historical background, as well as story of modern methods of production. Company will provide one for each pupil. Supplied continuously.

**Walter Kidde and Co., Inc.,** 140 Cedar St., New York City. Free.

A number of interesting pamphlets, showing the use of The Lux System to extinguish fires. Carbon dioxide is the substance employed.

**Liquid Carbonic Co.,** Chicago, Ill. Free.

A number of pamphlets on the properties, production, and uses as a refrigerant, and in other ways, of carbon dioxide.

**Stackpole Carbon Products.** Stackpole Carbon Co., St Mary's Pa. Free.

A catalog showing various carbon brushes used on motors, etc.

### Chromium

**Thermalloy.** The Electro-Alloys Co, Elyria, Ohio. Free.

16 pages. Describes the manufacture and use of this substance, a chromium alloy.

**List B.** The International Nickel Co., 67 Wall St., New York City. Free.

This 4-page pamphlet lists the various free bulletins published by this company on the use and manufacture of nickel.

### Copper

**Anaconda Copper Mining Co.,** Butte, Mont., or 25 Broadway, New York City. Free.

"Great Falls Reduction Department." 48-page pamphlet describing Electrolytic Copper Refining Plant.

"Anaconda Reduction Works." 60-page pamphlet. Very fine booklet describing treatment of copper ore. Many pictures.

"Anaconda Copper Mining Co." 12 pages describing the Anaconda Co. Several pictures. Limited number to each school.

Above material all free.

**Copper and Brass Research Association**, 25 Broadway, New York City. Free.

A number of beautifully printed and valuable pamphlets on copper and brass will be sent by this company upon request. They deal primarily with the use of copper in the home. Some of the titles are: "A Real Home" (47 pages); "Copper Roofings" (23 pages); "Home Fixtures" (16 pages); "What Good Is Screen That Rusts?" (16 pages); "Real Roofings" (16 pages); and "Copper Flashings" (66 pages).

**The Story of Copper.** Watson Davis. Copper and Brass Research Association, 25 Broadway, New York City. Free to teachers.

380 pages, 56 illustrations. The history of man's use of copper. Modern methods of mining and refining. Also several chapters on the use of copper and bronze. This reference should be in every science library.

### Electrolysis

**Electrolysis, and Its Mitigation.** U. S. Bureau of Standards, Technical Paper No. 52. Superintendent of Documents, Washington, D. C. 15c.

143 pages. Electrolysis and corrosion and methods of mitigation in pipes and railway return systems.

### Fuels and Flames

**Manufactured Gas.** American Gas Association, 420 Lexington Ave., New York City. Free.

A 12-page bulletin describing the manufacture of gas, its characteristics, how to read a meter, etc. Excellent. One for each pupil.

"Gas, the Ideal Factory Fuel" is another publication of value; 34 pages. Shows many uses in industry.

"The American Gas Association Testing Laboratory," a third publication, is of 27 pages. It describes the laboratories and explains tests of various kinds.

**Aero Alarm Co.**, 56 West 45th St., New York City. Free.

Small bulletin of 18 pages describing use of Aero Automatic Fire Alarm System.

**Carburizing Pamphlets.** American Gas Furnace Co., Elizabeth, N. J. Free.

Several small pamphlets dealing with modern carburizing machines. Titles: "Rotary Machines for Carburizing," "Rotary Carburizing," "Gas Carburizing," and several single sheets of pictures. Also a number of smaller pamphlets and bulletins covering such types of equipment as oven furnaces, gas forges, cyanide furnaces, melting furnaces, etc. Probably rather technical for high school students. One set to a school.

**Smithsonian Institution,** Washington, D. C. Free.

Pamphlets dealing with gas, coal, and water-power problems.

**Petroleum Products.** The Texas Co., 17 Battery Pl., New York City. Free.

82 pages. A bound book showing uses of oils and greases. Many pictures of machines.

### Hydrogen

**The ABC of Hydrogen Ion Control.** The LaMotte Chemical Products Co., 426 Light St., Baltimore, Md. Free.

124 pages. Sent only to teachers. Primarily a catalog.

### Iron and Steel

**Steel Never Fails.** American Institute of Steel Construction, Inc., 285 Madison Ave., New York City. Free.

20 pages; many fine illustrations; showing use of steel in many ways.

**Research on the Corrosion Resistance of Copper Steel.** American Sheet and Tin Plate Co., Frick Bldg., Pittsburgh, Pa. Free.

Pamphlets on the use and characteristics of steel, alloyed with copper. Several other publications in the same field.

**The Story Your Ink Bottle Tells.** The Carter Ink Co., Boston, Mass. Free.

A 16-page bulletin; 7 illustrations. Shows the manufacture of ink. Limited to 25 copies to a school.

**Central Alloy Steel Corporation, Massillon, Ohio.** Free bulletins.

"Metallurgy of Modern Commercial Iron Sheets." 16 pages. One for each student.

"The Path to Permanence." 52 pages. Deals with use of non-rusting iron. Enough for one class.

"Sheet Iron—A Primer." 64 pages. Particularly intended for the use of schools. Enough for each pupil.

"Agathon Enduro Stainless Iron." 32 pages. Enough for one class.

**Pamphlets on Saw and File History and Construction.** Henry Disston and Son, Philadelphia, Pa. Free.

These four booklets are entitled: "The File in History," "The Saw in History," "How a Disston Hand Saw Is Made," and "The Disston Saw, Tool, and File Book." They are very nicely compiled and will probably be of some value in chemistry, although their greatest value is to the manual training teacher.

**Duriron.** The Duriron Co., Dayton, Ohio. Free.

6 pages. Describes the metal and the fixtures made from it.

**Genfire Steel Co., Youngstown, Ohio.** Free.

A set of four pamphlets showing steel applied to industry. Titles: "Architectural Details," 23 pages; "Steel Joists," 40 pages; "The Water-proofing Handbook," 79 pages; "The Fire-proofing Handbook," 31 pages. Limited number.

**Minnesota Steel Company, Morgan Park, Duluth, Minn.** Free.

How steel and steel ware products are made, told in a pamphlet bearing the firm name as a title.

**Parker Rust-Proofing Process.** Parker Rust-Proof Co., 2177 East Milwaukee Ave., Detroit, Mich. Free.

A 32-page booklet describing the process of Parkerizing, which consists in chemically converting the surface of iron into insoluble phosphates.

**Analyzed Iron and Manganese Ores.** Bureau of Standards Circular No. 26. Superintendent of Documents, Washington, D. C. 5c.

Rather technical. A teacher's reference.

**Ferro Carbon—Titanium.** The Titanium Alloy Manufacturing Co., Niagara Falls, N. Y. Free.

A 44-page booklet describing the effect of titanium as a deoxidizer for steel.

**Truscon Steel Co.,** Youngstown, Ohio. Free.

Set of three catalogs showing the use of Truscon in building operations. Many pictures.

**The Story of Steel.** United States Steel Corporation, 71 Broadway, New York City. Free.

63 pages. From iron ore to finished product. Each page bordered by a sequence of pictures taken from motion picture of same title.

### Laboratory

**Suggestions on Laboratory Methods.** Educational Service Dept., Central Scientific Co., 460 East Ohio St., Chicago, Ill. Free.

Many specific hints for teachers of chemistry, with lists of reagents and apparatus.

**Chemical Laboratories.** No. 60. National Safety Council, 168 North Michigan Ave., Chicago, Ill. Free to teachers.

Laboratory technique by which accidents may be avoided. Also "Acids and Caustics."

### Metric System

For publications under this head see under PHYSICS—Mechanics, Measurements (p. 305).

### Nitrogen Family

**The Quencher and Globe Automatic Sprinklers.** Globe Automatic Sprinkler Co., 2035 Washington Ave., Philadelphia, Pa. Free.

Two excellent pamphlets showing the use of automatic sprinklers and fire extinguishers. An excellent set of pictures accompanies these pamphlets.

**Grinnell Sprinkler and Automatic Fire Protection.** Grinnell Co., Publicity and Promotion Dept., 277 West Exchange St., Providence, R. I. Free.

The first pamphlet, of 18 pages, describes the construction; the second, which has 28 pages, shows the uses of sprinklers.

**The Selection and Conservation of Textiles.** Laundry Owners' National Association of the United States and Canada, LaSalle, Ill. Free.

A folder containing a number of small leaflets on the weaving and laundering of various cloths.

**From Grey to Beauty.** Mount Hope Finishing Co., North Dighton, Mass. Free.

A 61-page illustrated booklet, describing the processes of bleaching, dyeing, and finishing cloth. A beautiful booklet and one of great value.

**Six Booklets on Explosives.** E. I. du Pont de Nemours Co., Wilmington, Del. Free.

These booklets averaging about 80 pages apiece contain many pictures and much information about the manufacture and use of explosives. Their titles are: "High Explosives," "High Explosives" (second section), "Permissible Explosives," "Farmers' Handbook of Explosives," "Blasting Accessories," and "Ditching with Dynamite."

**Hercules Powder Co.,** Wilmington, Del. Free.

Will furnish booklets on various topics in connection with explosives.

**The Romance of the Match.** Diamond Match Co., New York City. Free.

Beautifully printed 44-page booklet, tracing the history of the use of fire by man.

### Organic Chemistry

**Varnish Gums, Varnish, and Varnishing.** Berry Brothers, 211 Leib St., Detroit, Mich. Free.

24 pages. Describes the production of varnishes. Good material. Limited number to a school. Company will also send advertising circulars.

**Candy—A Food or a Luxury.** Essex Gelatine Co., Boston, Mass. Free.

This and a number of similar leaflets deal with the chemistry of candy and various problems in its manufacture.

**Something About Sugar and Manufacture of Refined Cane Sugar.** California and Hawaiian Sugar Refining Corporation, 215 Market St., San Francisco, Calif. Free.

The first booklet has 31 pages, and many illustrations. The second, 27 pages, and many illustrations. The first booklet deals with sugar cane growing and the complete sugar refining process. The second booklet, by A. W. Allen, covers practically the same ground but in somewhat more detail. Both are valuable. Company will probably furnish one to each student.

**The Preparation of Synthetic Organic Chemicals.** Eastman Kodak Co., Rochester, N. Y. Free.

Technical, but interesting. Reference material of considerable value in this field.

**Alcohol for Industrial Purposes.** U. S. Industrial Alcohol Co., 110 East 42nd St., New York City. Free.

48 pages. Showing many uses of alcohol in industry and elsewhere. Also, "Solvents," 44 pages.

**Tubize.** Tubize Artificial Silk Co., 303 Fifth Ave., New York City. Free.

A 16-page booklet giving history and uses of Tubize Artificial Silk. Enough furnished for a class.

### Oxygen

**Answers to Questions About the Oxy-acetylene Process.** Air Reduction Sales Co., 342 Madison Ave., New York City. Free.

24 pages, several pictures. Deals with the principles and history of the oxy-acetylene process. Shows pictures of equipment and tells of its use and care. Limited quantities furnished.

**Atmos Co.,** 105 West 40th St., New York City. Free.

Booklets on oxygen in industry.

**Oxy-acetylene Welding and Cutting and Ox-welder's Manual.** The Linde Air Products Co., 30 East 42nd St., New York City. Free.

The first booklet is of 12 pages. Company will furnish one to each student. The manual of 235 pages will be supplied in limited numbers.

**Lecture Experiments with the Common Gases for High School Use.** The Matheson Co., North Bergen, N. J. Free

30 pages, illustrated. Shows numerous interesting experiments, in which this company's lecture bottle of gases is used.

**Mine Safety Appliances Co., Pittsburgh, Pa.** Free.

Pamphlets on the oxygen appliances used to prevent gas poisoning.

### Precious Metals

**Eastman Kodak Co. Rochester, N. Y.** Free.

A set of bulletins dealing with various phases of photography. Titles: "Printing"; "Reproduction Work"; "Professional Equipment"; "Color Films"; "Plates and Filters"; "Picture Taking at Night."

**Collodion.** Eastman Kodak Co., Rochester, N. Y. Free.

28 pages. The making of wet-plate negatives for photo-engraving work.

**The Home of Film.** Eastman Kodak Co., Rochester, N. Y. Free.

Illustrations and description show the chemical and mechanical processes in the manufacture of film. Another booklet, "The Home of Kodak." Free.

**The Development and Manufacture of Silverware.** International Silver Co., Bridgeport, Conn. Free.

A series of 3 lectures: the first on development of silverware; the second, a glossary of terms, the third, a trip through a factory.

**The Story of Gold.** Mentor Association, Springfield, Ohio. 35c.

Valuable material.

### Radium

**The Commercial Production and Uses of Radium.** Radium Chemical Co., 511 Fifth Ave., New York City. Free.

A 15-page reprint from the Journal of Chemical Education. Interesting account.



### Silicon

**Alberene, the Natural Stone.** Alberene Stone Co., 153 West 23rd St., New York City. Free.

Shows the use in the home. 16 pages. Also "Alberene Stone," a catalog showing the material used in laboratories, showers, electrical work, etc. Furnished in reasonable quantities.

**Alpha Cement—How to Use It.** Alpha Portland Cement Co., Easton, Pa., or 165 West Wacker Drive, Chicago, Ill. Free.

112 pages. Quite good material, describing the use of cement. The company will provide one for each pupil.

**Anti-Hydro Waterproofing Co.,** Newark, N. J. Free.

Pamphlets on use of Anti-Hydro waterproofing for concrete. Furnished in whatever quantity desired.

**The Carborundum Co.,** Niagara Falls, N. Y. Free.

No. 1. "The Romance of Carborundum." No. 2. "Abrasives in the Service of Industry." No. 3. "The Man Who Didn't Know When He Had Failed."

No. 1, although the smallest in size, is in many ways the best of the three. It tells the story of the manufacture of Carborundum. No. 2, of 17 pages, describes Carborundum's use. No. 3 tells the story of its discovery. Good material. One furnished for each student.

**A Day at the Onondaga Pottery.** Onondaga Co., Syracuse, N. Y. Free.

An excellent descriptive booklet.

**Portland Cement Association,** 33 West Grand Ave., Chicago, Ill. Free.

"Titles are: "High Light in the Portland Cement Industry," 12 pages; "Portland Cement, Its Characteristics, Development and Manufacture," 12 pages; "Vocational Course in Concrete," 55 pages.

**Powdering and Burning a Mountain.** Universal Portland Cement Co., Frick Bldg., Pittsburgh, Pa., or 210 South LaSalle St., Chicago, Ill. Free.

A 24-page booklet, showing the manufacture of cement and some of its uses. Many pictures. Valuable material. Also, "The Magic Powder," which gives a more detailed description of cement manufacture than does "Powdering and Burning a Mountain."

**The Vollrath Company—Its History.** Vollrath Co., Sheboygan, Wisc.

16 pages. Describes history of the company and methods of manufacture of enamelware.

### Sodium and Potassium

**A Trip Through the Plant of the Diamond Crystal Salt Co.** Diamond Crystal Salt Co., St. Claire, Mich. Free.

This folder shows the process of producing salt. It is obtainable in limited quantities.

**How We Make Royal Crystal Salt.** Inland Crystal Salt Co., Salt Lake City, Utah. Free.

A 20-page booklet describing the process by which salt is obtained from Great Salt Lake.

**Potash Industry.** Potash Importing Corp. of America, Soil and Crop Service, 81 Fulton St., New York City.

Production and uses of potash.

**A Little Visit to the Home of Worcester Salt.** Worcester Salt Co., 71 Murray St., New York City.

Title explains nature of booklet.

### Tin and Lead

**Manufacture of White Lead.** Carter White Lead Co., West Pullman Station, Chicago, Ill. Free.

From the pure lead to the white lead of commerce.

**Protection of Structural Metal.** National Lead Co., 111 Broadway, New York City. Free.

This deals with use and composition of Dutch Boy Lead. Also, "Painting."

**The Materials of Paint Manufacture.** Paint Manufacturers Association of the United States, 636 The Bourse, Philadelphia, Pa. Free.

Valuable supplementary reading.

**How Paints and Varnishes Are Made.** Sherwin-Williams Co., Cleveland, Ohio. Free.

A 16-page booklet completely describing the manufacture.

### Water

**Colloid Mill.** The United States Colloid Mill Corp., East Ave., Long Island City, N. Y. Free.

A 12-page booklet showing the horizontal and vertical types of colloid mills. Of slight value in this field of work. Limited number.

**Wallace and Tiernan Co., Inc.,** Newark, N. J. Free.

Technical publications dealing with chlorination of water.

### Zinc Family

**Who's Who?** American Zinc Sales Co., Columbus, Ohio. Free.

A 24-page bulletin showing the use of zinc-oxide in many different fields. Good material. Also, "A Booklet of Useful Information for Paint and Varnish Manufacturers," 50 pages, rather technical, dealing with the use of zinc-oxide in painting.

**Asbestos-Cement Shingles.** The Philip Carey Co., Lockland, Ohio. Free.

This and other booklets describing asbestos products.

**Pure Zinc at Normal and Elevated Temperatures.** Superintendent of Documents, Washington, D. C. 15c.

Technical. For teachers' reference.

### Miscellaneous

**Duco: Clear and Colored Finishes.** E. I. du Pont de Nemours Co., Parlin, N. J. Free.

31 pages. Many pictures describing the manufacture and use of Duco.

**PAMPHLETS**

**Chemistry.** (Add other materials in space below.)

**D. PHYSICS****Electricity****APPLIANCES**

**Kitchen Tests of Relative Cost.** U. S. Bureau of Mines. Superintendent of Documents, Washington, D. C. Free.

A 16-page booklet on the relative cost of cooking by gas, coal, and electricity.

**ABC of Electricity for the Housekeeper.** Good Housekeeping Bulletin Service, 119 West 40th St., New York City. 25c.

A valuable 12-page pamphlet dealing with use of appliances, meter reading, etc.

**Catalog No. 120.** Metal Ware Corporation, Two Rivers, Wisc. Free.

20 pages. Many pictures of electric appliances, toys, and percolators.

**Understanding Your Electric Servants.** New York Edison Co., Bureau of Home Economics, 124 West 42nd St., New York City. Free.

A 33-page booklet, with information about household uses of electricity and definitions of electrical terms. One for each pupil. While the distribution of this booklet is limited to New York and vicinity, it is probable that other companies providing electricity for large cities issue a similar booklet. Other booklets of this company are: "Electric Meter Facts," a 24-page booklet dealing with meter reading, reasons for high electric bills, etc.; "Service and Meter Rules and Regulations," 63 pages describing conditions along these lines in New York City. Many wiring diagrams.

**BATTERIES**

**Delco-Light Battery.** Delco-Light Co., Dayton, Ohio. Free.

55 pages. Many pictures. A service manual covering the proper care of a Delco-Light storage battery. Has a good section on the action of a storage battery. A valuable book. The company will probably send one for each student.

**General Catalog.** Edison Storage Battery Co., Orange, N. J. Free.

The general catalog contains 40 pages describing the use and chemistry of the Edison cell. Monograph III of 40 pages describes the manufacture more completely and shows tests made on the cell. The company will furnish enough for one class. Excellent material.

**The Dry Battery Handybook.** National Carbon Co., Inc., New York City. Free

A 72-page booklet dealing with the use of a dry cell and many projects which can be carried out by students. Its explanation of the principles of electricity is exceptionally good. One for each student

**Electrical Characteristics and Testing of Dry Cells.** U. S. Bureau of Standards, Circular No. 79. Superintendent of Documents, Washington, D. C. 15c.

**Primary Battery.** Superintendent of Documents, Washington, D. C. 10c.

A 67-page bulletin. Illustrated.

**Westinghouse Batteries.** Westinghouse Union Battery Co., Swissvale, Pa. Free.

Catalogs and data sheets showing characteristics of various types of batteries. One provided for each pupil.

#### BIOGRAPHY

**Edison's Part in Radio and Other Notable Achievements.** Thos. A. Edison, Inc., Orange, N. J.

A small 12-page booklet containing a valuable chronology of the important achievements of Edison.

**C. P. Steinmetz.** The Mentor Association, 114 East 16th St., New York City. 35c.

The above is the title of an issue of the Mentor written by J. W. Hammond. Write to the Single Sales Department, Springfield, Ohio.

#### ELECTROLYSIS

See ELECTROLYSIS under CHEMISTRY (p. 274).

#### GENERAL

**Electricity.** The Boy Scouts of America, 2 Park Ave., New York City. 20c.

52 pages of various projects in electricity. Defines some terms and has an interesting section on electricity as a professional field. Includes probable cost of a technical education.

**General Electric Co., Business Training Course, Schenectady, N. Y.** Free.

A 36-page booklet describing the development and organization of the company. Contains an excellent diagram showing the generation, distribution, and use of electricity.

**Illinois Committee on Public Utility Information.** 125 South Clark St., Chicago, Ill. Free.

Bulletins on gas and electric subjects. Distribution probably limited to Illinois and vicinity.

**Safety for the Household.** Circular No. 75. Superintendent of Documents, Washington, D. C. 15c.

124 pages. Hazards in the household due to many causes. Electricity and lightning occupy nearly half of the book. The remainder is devoted to hazards due to gas, fire, and chemicals.

**Westinghouse Catalog.** Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa. Free.

A 1168-page book, listing all kinds of electrical equipment.

#### HEATING

**Electric Heaters.** Acme Electric Heating Co., 1207 Washington St., Boston, Mass. Free.

38 pages of material describing various kinds of electrical heaters. Many pictures. One for each student by paying transportation costs.

**Handbook on Fuses and "Fuseology."** Bussmann Mfg. Co., University and Jefferson Sts., St. Louis, Mo. Free.

The first has 9 pages showing how to renew fuses and avoid trouble. The second, of 24 pages, covers in less detail some of the same ground as the former and explains how a fuse works. Excellent material. The company will furnish enough for one class.

**Range Catalogs.** A. J. Lindemann and Hoverson Co., Milwaukee, Wisc. Free.

Catalogs describing the Lindemann and Hoverson ranges and other electrical appliances. Booklets on care, which are of value, also sent.

**Industrial Applications for Electric Heat.** New York Edison Co., Irving Pl. and 15th St., New York City. Free.

A series of pictures with captions showing electrical heat applied to all kinds of industries.

## INCANDESCENT LAMP

**History of the Incandescent Lamp.** J. W. Howell and H. Schroeder. The Maqua Co., Schenectady, N. Y. 1927.

205 pages, many illustrations. Describes in detail the history and modern method of manufacture of the incandescent lamp. Can probably be obtained free from Edison Lighting Institute, Harrison, N. J.

## INSTRUMENTS

**Checking and Calibrating Electrical Instruments.** Electrical Testing Laboratories, 80th St. and East End Ave., New York City. Free.

A 24-page booklet. Also, "Tests of Small Domestic Appliances," and "Testing Inspection on Lead Covered Cable." All of above are excellent material.

**Electric Meter History and Progress.** R. C. Lamphier. Sangamo Electric Co., Springfield, Ill. 1925. Free.

72 pages. Contents: Early Types of Meters, Development of the Induction Meter, Features of Meter Design, Some Special Metering Problems, The Importance of Instrument Transformer Accuracy, Special Types of Meters, and Interesting Meter Applications. An excellent little reference work.

**Sangamo Meters.** Sangamo Electric Co., Springfield, Ill. Free.

32 pages. Shows meter construction and connections. Also large folder containing many smaller catalogs of transformers, electric clocks, etc.

**Electrical Measuring Instruments.** U. S. Bureau of Standards Circular No. C 20. Superintendent of Documents, Washington, D. C. 1915. 15c.

The fundamental principles of instruments. 57 pages. Sources of error are treated in some detail.

**Monograph B-7.** Weston Electrical Instrument Co., Newark, N. J. Free.

A "theoretical treatise of permanent magnet movable coil and movable iron types of instruments." Contains many experiments using such instruments. Several copies furnished. Excellent material. Can be obtained also from Central Scientific Co., 460 East



Ohio St., Chicago, Ill. Other publications include a small booklet of 47 pages, describing the use of Weston Model 280 voltammeter in automobile ignition testing. "Monograph B-8" will be published soon. It will cover the movable iron dynamometer and thermo types of instruments. "Will also include some of the more advanced high school experiments and will be particularly adapted to vocational work."

### LIGHT

See **LIGHT** and **LIGHTING**, for list of free publications on this topic. Many of these pamphlets overlap the electrical field.

**Cooper Hewitt Electric Co., Hoboken, N. J.** Free.

A series of pamphlets describing various types of mercury vapor lamps and their use in industry and laboratory.

**History of Electric Light.** Publication No. 2717. Smithsonian Institution, Washington, D. C. Free.

96 pages. From early electrical batteries to modern incandescent lamps. Excellent reference.

### MAGNETISM

**Testing of Magnetic Compasses.** U. S. Bureau of Standards, Scientific Papers No. 382. Superintendent of Documents, Washington, D. C. 5c.

8 pages. Technical, but good reference material.

**The Compass, the Signpost of the World.** Booklet F. Taylor Instrument Co., Rochester, N. Y. 15c.

24 pages, illustrated. History of the compass, its invention and uses in navigation and elsewhere.

### MOTORS AND DYNAMOS

**The Fractional Horsepower Single-Phase Motor Situation.** Electrical Testing Laboratories, 80th St. and East End Ave., New York City. Free.

8 pages. Standard specifications for small motors.

**Shepard Electric Crane and Hoist Co., Montour Falls, N. Y.** Free.

A catalog describing crane and derrick hoists, winches, etc. Many pictures.

**Wagner Electric Corporation**, 6400 Plymouth Ave., St. Louis, Mo. Free.

Bulletins No. 132 to 153. These bulletins deal with all types of motors and some transformers. No. 138 is a 24-page manual of electrical testing and is particularly valuable.

#### RADIO

**Eisler Radio Tube Machinery.** Eisler Engineering Co., 750 South 13th St., Newark, N. J.

A catalog listing many types of tube manufacturing equipment. Also a catalog "Neon Sign Machinery."

**French Battery Co.**, Madison, Wisc. Free.

Three little booklets issued by this company, "Radio Manual," "Ray-O-Vac C Batteries," and "Ray-O-Vac B Batteries," show the use of batteries in radio. In addition the Manual has some information about radio sets and a broadcasting station directory. The company will furnish one for each pupil.

**General Radio Co.**, Cambridge, Mass. Catalog free.

A small catalog describing the products of this company, who are makers of high-grade radio apparatus.

**Helpful Hints for Better Radio.** DeForest Radio Co., 139 Franklin St., New York City. Free.

A small 32-page booklet, telling of the development of the audion and explaining briefly some of the facts about radio operation.

**U. S. Bureau of Standards Publications.** Superintendent of Documents, Washington, D. C.

Scientific Paper No 354: "Principles of Radio Transmission and Reception with Antenna and Coil Aerials." 10c. 60 pages. Deals with the subject in a technical way. Circular No. 74: "Radio Instruments and Measurements." 334-page publication. A standard reference work. Published in 1924. 60c.

**Radio Telephone Broadcasting Equipment.** Western Electric Co., Publicity Dept., 195 Broadway, New York City. Free.

20 pages, illustrated. Actually a catalog, but contains much interesting material. Similar pamphlets on public address systems, audiometers, audiophones, cable amplifiers, etc., can also be obtained.

## RESISTANCE

**Monitor Controller Co.,** Baltimore, Md. Free.

A series of catalogs, describing starting devices for motors and speed controllers. The most valuable are "The Monitor System of Machine Tool Control," 32 pages; and "Printing Press Control," 2 pamphlets of 32 pages each.

**Ward Leonard Electric Co.,** Mount Vernon, N. Y. Free.

Catalogs, describing theatre dimmers and laboratory rheostats.

## STATIC ELECTRICITY

**Modern Methods of Protection Against Lightning, and Protection of Life and Property Against Lightning.** Superintendent of Documents, Washington, D. C. 5c each.

The bulletins listed above include a history of the lightning rod, rules concerning installation, etc.

**Protection.** Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa. Free.

A 16-page catalog describing the "Anti-Valve Lightning Arrester." Many good pictures.

## TELEPHONE AND TELEGRAPH

**American Telephone and Telegraph Co.,** 195 Broadway, New York City. New Jersey Bell Telephone Co., nearest commercial office. Free.

- No. 1. "The World Behind the Telephone." 30 pages.
- No. 2. "Things Worth Knowing About Your Telephone." 56 pages of good material.
- No. 3. "From the Far Corners of the Earth." 64 pages. Many pictures. Traces completely story of raw materials.
- No. 4. "The Magic of Communication." 38 pages. Describes the process in clear style. One of the best on the subject.
- No. 5. "How Do You Use the Telephone?" 12 pages. One copy provided for each pupil, except of pamphlet No. 3. Of No. 3 enough for one class.

**Illinois Bell Telephone Co.,** 212 West Washington St., Chicago, Ill. Free.

Pamphlets containing printed matter and sketches.

**The Wire System of a Great Railroad.** Pennsylvania Railroad, General Offices, Broad Street Station, Philadelphia, Pa. Free.

A 24-page booklet describing the railroad's telegraph and telephone system. Many pictures and diagrams. Good material.

**The Signal Call.** Signal Manufacturing Co., 154 West 145th St., New York City. Free.

This pamphlet describes this company's telephone equipment; in particular showing a schematic diagram of the Signal Call apparatus.

**Telephone Service.** U. S. Bureau of Standards, Circular No. C-112. 1921. 214 pages. Superintendent of Documents, Washington, D. C. 65c.

Service in general and telephone plant operation.

#### TRANSFORMERS

**A Lesson on the Transformer.** Central Scientific Co., 460 E. Ohio St., Chicago, Ill. Free.

An 8-page folder giving a number of laboratory experiments which use the "Cenco" model transformer.

#### UNITS

**Electric Units and Standards.** Circular No. 60. Superintendent of Documents, Washington, D. C. 15c.

68 pages. Covers not only the ordinary units, but absolute units and standards for these as well.

#### WIRING

**Electricity in the Home.** The Hoover Co., North Canton, Ohio. Free.

A very valuable 8-page bulletin, dealing with electrical wiring and appliances in the home. Contains a diagram of value, showing house wiring. Blank copies of diagram, on which the student's home system may be plotted, are obtainable. Order Form No. 314.

**House Wiring and Lighting for Service.** Good Housekeeping Bulletin Service, 119 West 40th St., New York City. 15c.

Excellent material for reference work.

**More Power to the Home—Wiring the Home.** National Electric Light Association, 29 West 39th St., New York City. Free.

A valuable 24-page booklet, describing in detail the proper methods of home wiring. Very valuable material. Can be obtained in many cases from public utilities companies, in which case one for each pupil may be obtained.

**Okonite Handbook.** The Okonite-Callender Cable Co., Passaic, N. J. Free.

This handbook describes the electrical cables and wires which this company puts out.

### X RAYS

**X Rays.** Eastman Kodak Co., Rochester, N. Y. Free.

64 pages, dealing with exposing and developing.

### Heat

#### ENGINES

**Alco Three-Cylinder Locomotives.** American Locomotive Co., 30 Church St., New York City. Free.

A 24-page pamphlet discussing the advantages of three-cylinder as against two-cylinder types of locomotives. Gives pictures and specifications of various types of locomotives.

**Ames Iron Works, Oswego, N. Y.** Free.

Pamphlets and catalogs dealing with the "Una-flow" engines, an improved type of reciprocating engine. The most valuable is "Una-Flow Engine," a well illustrated 32-page catalog.

**Locomotive Development.** Baldwin Locomotive Works, Philadelphia, Pa. Free.

22 pages. Tells the history of early locomotives, with many pictures of early and modern types.

**Climax Engineering Co., Clinton, Iowa.** Bulletins free.

Bulletin A—6 pages. Describes a 4-cylinder motor.

Bulletin B—8 pages. Describes a somewhat larger 4-cylinder engine.

Bulletin C—6 pages. Another series of 4-6 cylinder engines.

Bulletin D—24 pages. The most valuable of all. Shows a number of installations of Climax Gasoline Power Units. Quite good material. Limited number to a school.

**De La Vergne Machine Co.**, 910 East 138th St., New York City. Catalogs free.

This company will send descriptive catalogs of horizontal and vertical oil engines; also catalogs covering refrigerating machines. Will provide enough for one class.

**Clearing the Way for the Comforts of Life.** Ingersoll-Rand Co., 11 Broadway, New York City. Free.

A small pamphlet outlining the progress of American railroads and how our prosperity is indebted to them. Very good material. When present supply is exhausted no more are obtainable.

**Correct Automobile Lubrication.** Vacuum Oil Co., 61 Broadway, New York City. Free.

A very valuable 52-page publication. Contains many pictures of automobile engine construction.

**Wright Aeronautical Corporation, Paterson, N. J.** Free.

Set of pamphlets dealing with Wright Whirlwind and other types of engines. Many pictures of planes.

**The Balanced Ration.** Zenith Detroit Corp., Hart Ave., Detroit, Mich. Free.

A valuable little pamphlet explaining carburetor action.

#### EVAPORATION

**Buflovak.** Buffalo Foundry and Machine Co., Buffalo, N. Y. Free.

79 pages. Many pictures. Shows various kinds of dryers and evaporators. Limited number to a school.

#### EXPANSION

**The Lorain Oven Heat Regulator.** American Stove Co., St. Louis, Mo. Free.

27 pages. A sales manual, but describes the operation of this device clearly. One provided for each pupil.

**Mercoid Controls.** Federal Gauge Co., 564 West Adams St., Chicago, Ill. Free.

2 pamphlets describing thermostatic controls for heating systems and electric refrigerators.

**Minneapolis Honey-well Regulator Co.,** 5036 Grand Central Terminal, New York City. Free.

A set of catalogs showing details of construction and methods of installation of the Minneapolis Heat Regulator. The reference manual is particularly valuable.

**The Wilcolator Co.,** 17 Nevada St., Newark, N. J. Free.

Several pamphlets on the Wilcolator oven heat control. The most valuable are "The Wilcolator Instruction Manual," 16 pages; "The Truth About the Cold Check Method of Calibration," 11 pages. Supplied in some quantity.

### HEATING SYSTEMS

**New Radiator Products.** American Radiator Co., 40 West 40th St., New York City. Free.

43 pages of material dealing with American Radiator products. Several pictures and tables, charts of heaters. Furnished in limited quantity.

**Behind Your Cellar Door.** Domestic Stoker Co., 7 Dey St., New York City. Free.

10 pages. Many pictures. Shows the application of the "electric furnace man" to an ordinary heater.

**Heating the American Home.** Good Housekeeping Bulletin Service, 119 West 40th St., New York City. 25c.

Much valuable information about heating and heating systems.

**International Heater Co.,** Utica, N. Y.

A series of booklets on various types of heating systems.

**Hot Water Always for All Purposes.** Public Service Electric and Gas Co., Newark, N. J. Free.

A well illustrated catalog, showing details of construction of several types of water heaters. One catalog provided for each pupil. Although this is a publication of one particular public utilities company, most firms of this type will have similar publications. Inquire at your local office.

**Ruud Automatic Gas Water Heater.** Ruud Manufacturing Co., Pittsburgh, Pa. Free.

A 40-page catalog showing in detail the construction and proper method of installation of this type of heater. Good material. Another publication is issued: "Ruud Automatic Storage Systems." This is a smaller book. One provided for each pupil.

**Catalogs No. 215 and No. 230.** B. F. Sturtevant Co., Hyde Park, Boston, Mass. Free.

Catalog No. 215 is entitled, "Heating and Ventilation." It is a 323-page bound book, describing in detail heating and ventilating systems in schools, theatres, etc. A number of pictures and many tables of value. No 230 is a catalog of 124 pages. It is designed to meet the needs of classes interested in heating. Many pictures and diagrams. Every teacher should have these two.

**Thatcher Furnaces.** Thatcher Furnace Co., Newark, N. J. Free.

Many good pictures of heating systems, boilers, and furnaces.

**Trane.** The Trane Co., LaCrosse, Wisc. Free.

A beautifully illustrated catalog describing heat cabinets, heating specialties, and pumps. Aggregates about 150 pages.

#### HUMIDITY

**Johnson Service Co.,** 154 Lake St., Chicago, Ill. Free.

Pamphlets dealing with the Johnson system of pneumatic regulation of temperature and humidity.

#### INSULATION

**The Celotex Company,** 645 North Michigan Ave., Chicago, Ill. Free.

Pamphlets on use of Celotex as heat insulator in building construction. Several tables of heat transmission co-efficients are given. Enough pamphlets furnished for one class.

**Redbook.** United States Gypsum Co., 300 West Adams St., Chicago, Ill. Free.

124 pages, illustrated. Shows uses of the various insulating substances which this company puts out. Will furnish free copies, not to exceed 50 a year.

**United States Mineral Wool Co.,** 280 Madison Ave., New York City. Free.

Booklets on the use of mineral wool as an insulator in building construction.



## RADIATION

**Temperature Estimates of the Planet Mars.** Scientific Paper No. 512. Superintendent of Documents, Washington, D. C. 10c.

A 26-page technical discussion of temperature estimates, made on the basis of laws of radiation, and by comparison with the moon and the earth. Good teacher reference.

## REFRIGERATION

**Food Changes in an Ice Refrigerator and an Electrically Controlled Refrigerator.** Copeland Co., 630 Lycaete Ave., Detroit, Mich. Free.

A reprint from the Teachers College Record showing the changes which take place in various foods and the bacterial growth in these foods in the two types of refrigerators. One to a school.

**Refrigeration Tests.** Electrical Testing Laboratories, 80th St. and East End Ave., New York City. Free.

A 12-page booklet describing the process of testing iceless and old-style ice refrigerators. Illustrated.

**Fundamental Principles of Refrigeration.** Electric Refrigeration News, 554 Maccabees Bldg., Detroit, Mich. \$.50 per hundred.

"A condensed review of the physical laws upon which are based the design and operation of electric refrigeration equipment."

**The Gas Refrigerator.** Electrolux Servel Corp., 51 East 42nd St., New York City. Free.

A beautifully illustrated 12-page catalog. Has an excellent diagram, in color, of the complete cycle of operation, and a very full explanation. This company also has a smaller and less valuable pamphlet: "The Flame That Freezes," telling about the refrigerator in a general way.

**General Electric Refrigerator.** General Electric Co., Refrigeration Dept., Hanna Bldg., Cleveland, Ohio. Free.

20 pages. Many pictures but no description of operation.

**The A B C of Electrical Refrigeration.** General Refrigeration Company, Beloit, Wisc. Free.

A 24-page catalog outlining the history of refrigeration and describing the modern electric refrigerator. Has large cut in color of refrigerating cycle.

**Household Refrigeration Bureau**, 51 Chambers St., New York  
York City. Free.

This organization provides a valuable set of booklets on refrigeration topics. The most valuable to the physics teacher are "The Romance of Ice," 14 pages; "Cold is the Absence of Heat," 20 pages; "The Care of the Home Refrigerator," 4 pages; "Why We Refrigerate Food," 8 pages; "Where to Place Food in the Refrigerator," 8 pages. They also have other publications of somewhat lesser value. They will provide one for each student in the class. This material is of great value and should be secured.

**Kelvinator**. Kelvinator Corp., 2051 West Fort St., Detroit,  
Mich. Free.

A general catalog for dealers containing much material of value, especially sections E and F on different phases of operation.

**Leonard Refrigerator Co.**, Grand Rapids, Mich. Catalog  
free.

A large, well-illustrated catalog showing details of construction and types of refrigerators.

#### THERMOMETRY

**Brown Instruments**. Brown Instrument Co., Philadelphia,  
Pa. Free.

A large folder containing the smaller catalogs of the different instruments—pyrometers, thermocouples, thermometers, etc. Also carbon dioxide meters, flow meters, etc. One to each school.

**The Thermometer and Its Family Tree**. Taylor Instrument  
Co., Rochester, N. Y. 15c.

A 24-page, illustrated booklet (D) by P. R. Jameson. Tells history and development to date. Fine material.

**Tycos Instruments for Educational Institutions**. Taylor In-  
strument Co., Rochester, N. Y. Free.

72 pages, illustrated. Contains many valuable tables. Also shows the process of thermometer making. Excellent material.

## VENTILATION

**The Electrozone System of Ventilation.** The Air Conditioning and Engineering Co., 2914 South Jefferson Ave., St. Louis, Mo. Free.

7 pages dealing with ventilation and purifying of air by ozone.

**Carrier Engineering Corporation,** 750 Frelinghuysen Ave., Newark, N. J.

A series of free publications on ventilating machines. Includes "Weather; How It Is Made," an interesting bound book; "Theatre Cooling," 28 pages; "Manufactured Weather," 194 pages. Good material.

**Tunnel Construction Ventilation.**

**Auxiliary Ventilation for Coal Mines.**

**Ventilating Mines with Flexible Tubing.**

E. I. du Pont de Nemours Co., Fairfield, Conn. Free.

These three booklets contain much interesting information and many pictures about the method of tunnel and mine ventilation.

## WEATHER

**Weather Books for Amateur Forecasters.** Booklets A to F. Taylor Instrument Co., Rochester, N. Y. 15c each.

An excellent series by P. R. Jameson. The titles are:

Booklet A.—"Practical Hints for Amateur Weather Forecasters."

Booklet B.—"Humidity, Its Effect on Our Health and Comfort."

Booklet C.—"The Mountains of Cloudland and Rainfall."

Booklet D.—"The Thermometer and Its Family Tree."

Booklet E.—"The Barometer as the Foot-Rule of the Air."

Booklet F.—"The Compass, the Signpost of the World."

All are illustrated

## Light

## GENERAL

**Chapters on Light.** Illuminating Engineering Society, 29 West 39th St., New York City. 25c. 20c in quantities of more than 25.

This 56-page pamphlet is recommended for use as a supplementary text in light. It covers the main points of this section of physics from the point of view of illumination. It is of great value.

**Illuminating Engineering.** The Illuminating Engineering Society, 29 West 39th St., New York City. Free.

This society will send a series of publications outlining the scope of their profession.

#### LENSES

**About Lenses.** Eastman Kodak Co., Rochester, N. Y. Free.

31 pages, illustrated. Lenses as used in photography. Valuable reference material.

**A Safe Investment.** The C. P. Goerz American Optical Co., 317 East 34th St., New York City. Free.

A 24-page booklet on the products of this company. They also have other booklets.

**Account of Lick Observatory.** Lick Observatory, San José, Calif. 35c.

A descriptive account. Illustrated.

**Conserving the Sight of School Children.** National Committee for the Prevention of Blindness, 370 Seventh Ave., New York City. 25c.

A 46-page pamphlet dealing with visual defects, their cure and avoidance. Also, "Lighting the Schoolroom." Free.

**Adjust Your Headlights.** U. S. Bureau of Standards. Superintendent of Documents, Washington, D. C. 5c.

A series of pictures and text giving suggestions on how to adjust headlights properly.

#### LIGHTING

**Curtiss Lighting, Inc.,** 1110 West Jackson Blvd., Chicago, Ill. Free.

This company has a number of folders dealing with the lighting of libraries, theatres, and public buildings, floodlighting, etc., that contain many pictures of value.

**A Catalog of Theatrical Lighting Equipment and Effects.** Display Stage Lighting Co., Inc., 334 West 44th St., New York City. Free.

110 pages. Numerous interesting pictures showing the range of apparatus and equipment used in theatrical work.

**Bulletins on Mazda Lamps and Lighting.** Edison Lamp Works of General Electric Co., Harrison, N. J. Free.

These bulletins are sent free to "those interested in particular subjects, and a mailing list is maintained of individuals following lighting work." The most valuable to a physics teacher are:

LD 101B. "Effect of Maintenance and Color of Surroundings on Resultant Illumination." 28 pages, 10 illustrations. Reflection factors of different finishes.

LD 109B. "Lighting of Schools and Gymnasiums." 28 pages, 16 illustrations. Could be used as basis for project on survey of school lighting system.

LD 119B. "The Manufacture of the Edison Mazda Lamp." 24 pages, 43 illustrations. Well-illustrated account of the manufacture of lamp and component parts.

LD 130. "The Eye as Affected by Illumination." 16 pages, 5 illustrations. Study of the eye and effect of advantageous and disadvantageous conditions.

LD 137. "Residence Lighting." 36 pages, 30 illustrations. The application of correct lighting in the home. A most valuable pamphlet.

LD 146 A. "Stage Lighting." 48 pages, 29 illustrations. Historical evolution of stage lighting and modern apparatus. Light and color on the stage.

LD 149. "Mazda Lamps in Photography." 24 pages, 18 illustrations. Characteristics of Mazda lamps that make them valuable in different kinds of photography.

LD 155. "Illumination Terms." 56 pages. Explains terms by pictures.

LD OA. "Index of Information Contained in Lighting Data Bulletins." 16 pages. Lists in alphabetical order the principal subjects discussed. Gives page and bulletin where data may be found.

**Holophane Co., Inc.,** 342 Madison Ave., New York City.  
15c to 25c.

A series of valuable booklets on lighting. Titles are: "Scientific Street Lighting," 30 pages; "Streets That Are Safe," 19 pages; "Industrial Lighting," 23 pages; "The Lighting of Schools," 24 pages; "The Holophane Datalog," 48 pages. Very good material.

**Catalog M.** Kliegl Bros., 321 West 50th St., New York City.  
Free.

Will provide enough for one class. A 128-page publication showing interesting details of stage lighting.

**More Power to the Home—Better Lighting.** National Electric Lighting Association, 29 West 39th St., New York City. Free.

A valuable 32-page booklet, discussing the lighting of the home in detail. Each room is taken up, and a bibliography of books and pamphlets is given.

Can be obtained free in many cases from public utilities companies; one for each pupil.

**Engineering Department Bulletins.** National Lamp Works, Nela Park, Cleveland, Ohio. Free.

This series of bulletins on lighting topics is most valuable. Each bulletin really should be described in detail but lack of space precludes. Some of the titles are "Fundamentals of Illumination," 60 pages; "Illumination Terms," 56 pages; "Better Electric Lighting in the Home," 32 pages; etc.

Smaller booklets are "Light and Vision," "The Nela School of Lighting," and "School Lighting."

Some of this material is duplicated by the publications of the Edison Lamp Works described above.

Where definitely used as texts for courses enough for each pupil or, at least, enough for one class is furnished.

**Industrial Efficiency.** Sherwin Williams Co., 601 Canal Rd., Cleveland, Ohio. Free.

A 20-page pamphlet showing advantages of white paint in factories.

#### PHOTOGRAPHY

**Tennant and Ward,** 122 East 25th St., New York City. 25c.

A series of publications on photographic subjects.

**Hammer's Little Book.** Hammer Dry Plate Co., St. Louis, Mo.; or 159 W. 22nd St., New York City. Free.

A 32-page booklet giving "a short talk on negative making, with many helpful formulas."

#### PHOTOMETRY

**The Measurement of Light.** Electrical Testing Laboratories, 80th St. and East End Ave., New York City. Free.

A valuable little 16-page booklet showing various photometric determinations.

**Mechanics**

## GENERAL

**The Ford Industries.** Ford Motor Co., Detroit, Mich. Free.

A well-illustrated 64-page booklet, giving many facts about this company and its subsidiaries.

**National Bureau of Standards.** Superintendent of Documents, Washington, D. C. 50c.

113 pages Describes the work of the bureau. Published in 1925

## AUTOMOBILES

**Know Your Car.** Standard Oil Co. of New York, 26 Broadway, New York City. Free.

38 pages, with many illustrations. Describes the parts of the auto in a simple way The company probably will provide enough for one class. Very good material.

## FORCES

**Fokker.** Atlantic Aircraft Corp., Hasbrouck Heights, N. J. Free.

The above name is applied to several catalogs describing Fokker aircraft, and showing details of construction. The company will probably send a photo of a plane.

**Tinius Olsen Testing Machine Co.,** 500 North 12th St., Philadelphia, Pa. Free.

Catalog—Parts "A," "B," and "C." These three catalogs describe machines for testing all kinds of physical properties. Useful in a study of properties of matter and Hooke's Law.

**Page Highway Guard.** Page Steel and Wire Co., Bridgeport, Conn. Free.

32 pages. Describes tests made on this heavy fencing material.

**A Tribute—Samuel Pierpont Langley, Pioneer in Practical Aviation.** Smithsonian Institution, Washington, D. C. Free.

10 pages, 9 plates. An interesting article dealing with an early attempt at aeroplane flight.

## FRICTION

**Standard Conveyor Co.,** North St. Paul, Minn. Free.

A set of catalogs showing the use of gravity and pneumatic tube systems. Many valuable pictures.

**The Truth About Anti-Friction Bearings.** Timken Roller Bearing Co., Canton, Ohio. Free.

A small booklet showing the use of bearings. The company will furnish one for each student, and will also send large pictures of bearings in use, which are reproductions of magazine advertisements.

**Vacuum Oil Co.,** 61 Broadway, New York City. Free.

This company has a number of pamphlets dealing with lubrication of all types of machinery and containing many diagrams of machine parts in color. Excellent material.

#### HYDRAULICS

**East Bay Water Co.,** 512 16th St., Oakland, Calif. Free.

This company has two booklets, one on the distribution of water, and the other on the San Pablo filter plant.

**Goulds Pumps, Inc.,** 16 Murray St., New York City. Free.

A series of bulletins on the uses of various kinds of pumps. Many pictures. Of considerable value.

**The Holland Tunnel.** Office of the Commissions, Administration Bldg., Canal and Varick St., New York City. 2c (stamp).

A small folder giving information and rates.

**Pelton Water Wheels.** The Pelton Water Wheel Co., 100 Broadway, New York City. Free.

A 32-page pamphlet describing this type of water wheel. Many pictures.

**The Submarine and The Enemy Submarine.** The Secretary of the Navy, Dept. of Inventions, Washington, D. C. Free.

Two booklets dealing with various features of submarine warfare. The second booklet gives a short history of the submarine.

**Naval Inventions.** Navy Consulting Board, Navy Dept., Washington, D. C. Free.

A 10-page pamphlet describing the various details of submarine invention and development. Also gives advice to naval inventors.

**Smithsonian Institution,** Washington, D. C. (Mr. Wyer). Free.

A series of pamphlets dealing with gas, coal, and water power problems.



## MACHINES

**Pennsylvania Railroad Plate Fulcrum Master Scale.** Pennsylvania Railroad, General Offices, Broad Street Station, Philadelphia, Pa. Free.

32 pages. Describes the master scale at Altoona, Pa., for weighing cars, etc. Many pictures.

**Petroleum Products.** The Texas Co., 17 Battery Pl., New York City. Free.

A bound book of 82 pages. Although primarily devoted to lubrication, many good pictures of machines are shown.

## MEASUREMENTS

**Measurements for the Household.** U. S. Bureau of Standards, Circular No. 55. Superintendent of Documents, Washington, D. C. 45c.

An excellent publication of 149 pages. Deals not only with weights and measures, but also with the measurement of light, heat, humidity, etc.

**History of the Standard Weights and Measures of the United States.** U. S. Bureau of Standards. Superintendent of Documents, Washington, D. C. 15c.

34 pages with many illustrations. Gives history of important measures of length, weight, etc. Metric system also discussed.

**Miscellaneous Publications.** U. S. Bureau of Standards. Superintendent of Documents, Washington, D. S.

No. 21 is a metric manual for soldiers, 5c; No. 47, a table for changing millimeters to inches, 5c; No. 67 a table for changing kilocycles to meters, or reverse, 5c.

**What Will Metric Standardization Cost?** The World Trade Co., 681 Market St., San Francisco, Calif. 50c.

A 148-page publication giving views of important men on the universal adoption of the metric system. Other publications on the metric system are put out by this firm.

## MINING

**Mining.** Boy Scouts of America, 2 Park Ave., New York City. 20c.

28 pages. Has sections on identifying minerals and on mining engineering as a life profession.

## PNEUMATICS

**Aero Alarm Co.,** 56 West 45th St., New York City. Free.

A 20-page booklet describing alarm system operated by air pressure.

**Standard Conveyor Co.,** North St. Paul, Minn. Free.

This company's catalog No. 4 shows in detail the operation of a pneumatic tube system for the transportation of small articles.

**Testing of Barometers and Altimeters.** U. S. Bureau of Standards, Circular No. 46. Superintendent of Documents, Washington, D. C. 10c.

24 pages. Errors and tests on mercurial and aneroid barometers.

**The Barometer as the Foot-Rule of the Air.** Taylor Instrument Co., Rochester, N. Y. 15c.

Booklet E, 24 pages, illustrated. The invention of the barometer and its evolution to the present. Valuable.

**Compressed Air Machinery and Equipment.** National Safety Council, 168 North Michigan Ave., Chicago, Ill. Sale.

Safe-practice pamphlet No. 47.

**High Pressure Air and Gas Compressors.** The Norwalk Co., South Norwalk, Conn. Free.

32 pages. Description and excellent cuts showing construction and operation.

**Westinghouse Air Brake Co.,** Pittsburgh, Pa. Free.

This company issues a number of valuable publications on air brakes, showing details of construction.

## Sound

**Acousti-Celotex.** The Celotex Co., 645 North Michigan Ave., Chicago, Ill. Free.

A beautifully illustrated booklet dealing with the application of this particular material. Many facts about acoustics.

**The Perception Characteristics and Reproduction of Speech and Musical Sounds.** United Radio Corp., Rochester, N. Y. Free.

40 pages. A lecture delivered by Dr. John Minton. Describes how we hear and the reproducing effects of different sound frequencies. Good material.

**Sound-Absorbing Treatment in Banks and Offices.** Johns-Manville Corp., 292 Madison Ave., New York City. Free.

A valuable 20-page pamphlet setting forth the means for reducing noise, thereby increasing the efficiency and happiness of the workers. Similar in nature and teaching value are three others on the acoustics of churches, restaurants, and hospitals.

#### Miscellaneous

**A Description of the Science Laboratories of the Lincoln School of Teachers College.** The Lincoln School, 425 West 123rd St., New York City. 45c.

A 40-page pamphlet describing the various laboratories. Every science teacher would profit by reading this through. Illustrated.

**PTL Bulletins.** Pittsburgh Testing Laboratory, Pittsburgh, Pa. Free.

A set of bulletins describing all kinds of testing in both physical and chemical lines.

#### PAMPHLETS

**Physics.** (Add other materials in space below.)

## XV. PERIODICALS

The list of periodicals given in the following classification is undoubtedly larger than any science department would wish to receive. A glance at the comment, however, will make clear the value of each magazine. Some are of a local or sectional value, others are for teacher reference, still others are for occasional student reading, while a last group is of a popular nature. Students do not, as a rule, need encouragement to induce them to read periodicals from this latter group. They probably have done so for several years before entering the science class. It is to the more technical group that they need introduction. A good way to get the average student to read these magazines is to make special assignments of reading as the basis for reports to the class or for use in a project. These special assignments should be taken from cards which list, classify, and describe briefly the leading articles in the magazines received by the department. These cards should be written when magazines are received, and kept in the teacher's file.

A person glancing over the following list will be impressed by the large number of free periodicals. In fact, by subscribing to a few magazines of the popular class, and by securing the free publications applicable to one's subject, a teacher may acquire, with little cost, quite an array of valuable periodical literature.

### A. JOURNALS FOR TEACHERS OF SCIENCE

**The Chemist-Analyst.** J. T. Baker Chemical Co., Phillipsburg, N. J. Free.

Of some value to a chemistry teacher, but chiefly for the industrial chemist.

**DeVry Movie News.** The DeVry Corp., 1111 Center St., Chicago, Ill. Free.

Monthly. Many illustrations. News concerning photography and emphasis on use of motion pictures in schools.

**Educational Information Service.** National Child Welfare Association, 70 Fifth Ave., New York City. \$1.00.

Nine issues. A monthly digest of current literature on recreation, visual education, health topics, and similar themes.

**Educational Screen.** 5 South Wabash Ave., Chicago, Ill. \$1.50.

Monthly, except for July and August. Best publication in the field of visual education.

**Engineering Education.** University of Pittsburgh, Pittsburgh, Pa. \$3.00.

Monthly, except July and August. Promotion of engineering education.

**Gaylord Triangle.** Gaylord Bros., 155 Gifford St., Syracuse, N. Y. Free.

A monthly publication, containing library news, useful hints about the care of books, and announcements of new supplies.

**General Science Quarterly.** W. G. Whitman, Salem, Mass. \$1.50.

Monthly, except for July and August. Excellent publication for a teacher of general science.

**Home-Makers Bulletin.** Home-Makers Educational Service, 22 Grove St., Freeport, N. Y. Free to teachers of home economics.

Gives sources of charts, exhibits, etc. Its motto is "Better products for better homes."

**Journal of Chemical Education.** 19th and Northampton Sts., Easton, Pa. \$2.00.

Monthly. A journal devoted to the interests of chemistry teachers. A valuable publication.

**The Kalends.** Williams and Wilkins Co., Baltimore, Md. Free.

Monthly. Discussions of the progress of science, book reviews and announcements, etc.

**The Laboratory.** Fisher Scientific Co., Pittsburgh, Pa. Free.

Monthly. "For those interested in keeping informed on the latest developments of laboratory apparatus and technique."

**McGraw-Hill Book Notes.** McGraw-Hill Book Co., 370 Seventh Ave., New York City. Free.

Announcements and reviews of scientific publications, with notes on authors, science laboratories, etc.

**The Museum News.** American Association of Museums, 2 West 46th St., New York City. \$1.00.

Semi-monthly. Information about museum exhibits.

**Museum Service.** Municipal Museum, Rochester, N. Y. Free.

Monthly. Excellent notes about museum work.

**Museum Work.** American Association of Museums, 2 West 46th St., New York City. \$2.00.

Bi-monthly. Deals with the activities of museums and their use.

**Nature and Science Education Review.** 1214 Sixteenth St., Washington, D. C. \$1.00.

Quarterly. A new journal for teachers of nature study and science, giving reports of work, special news, book reviews, programs, and other suggestions. Helpful material.

**Palo Bulletin.** The Palo Co., 153 West 23rd St., New York City. Free.

Published occasionally with announcements concerning new laboratory apparatus and supplies.

**The Principal and Science Teacher.** 2229 McGee Ave., Berkeley, Cal. 50c.

Monthly. Should make for a better understanding of mutual problems.

**School Science and Mathematics.** 404 North Wesley Ave., Mount Morris, Ill. \$2 50.

Monthly, except July, August, and September. The journal of the Central Association of Science and Mathematics Teachers. One of the best known magazines in the field.

**The School Science Review.** G. H. J. Adlam, Editor, City of London School, London, England. 10s. 8d.

Quarterly. The journal of the Science Masters Association of England.

**School Service Bulletin.** Experimenter Publishing Co., 230 Fifth Ave., New York City. 25c.

A magazine corresponding somewhat in style and scope to The Science Classroom. A companion publication to Science and Invention.

**The Science Classroom.** Popular Science Publishing Co., 250 Fourth Ave., New York City. 25c.

Monthly (10 months). No science teacher should be without this publication. It is a clearing house for many valuable suggestions and ideas.

**Van Nostrand's Record of Scientific Literature.** D. Van Nostrand Co., 8 Warren St., New York City. Free.

Monthly. A bulletin describing recent scientific books, and containing portraits of authors and pictures of science laboratories, with news items

**Visual Review.** Society for Visual Education, Chicago, Ill. Free.

An annual publication of about 50 pages devoted to practical information for teachers in developing visual instruction programs.

**Wiley Bulletin.** John Wiley and Sons, 440 Fourth Ave., New York City. Free.

Contains extended publishers' announcements of scientific books, usually with portraits of authors, etc.

**The Wistar Bibliographic Service.** Wistar Institute of Anatomy and Biology, 36th and Woodland Ave., Philadelphia, Pa.

1. Advance Abstract Sheets, \$3.00 per year.
2. Bibliographic Service Cards, \$5.00 per year.
3. Abstracts in Book Form, \$5.00 per volume.

**JOURNALS FOR TEACHERS OF SCIENCE.** (Add other materials in space below.)



**B. POPULAR MAGAZINES OF SCIENCE**

**Amateur Movie Makers.** Amateur Cinema League, Inc., 105 West 40th St., New York City. \$3.00.

Monthly. Devoted to the encouragement of amateur motion pictures.

**American Bee Journal.** Hamilton, Ill. \$1.00.

Monthly Illustrated Intended for professionals and amateurs in apiculture.

**The American Botanist.** Willard N. Clute, Editor, Butler University, Indianapolis, Ind. \$2.00, 3 years for \$5.00.

Quarterly 64 pages. A journal of popular botany for every plant lover, amateur or professional Notes, descriptions, book reviews, etc.

**The American Boy,** 5 Lafayette Blvd., Detroit, Mich. \$2.00.

Monthly. Although not strictly a science magazine, there are many projects to be found here. The one creating the greatest interest is an airplane construction contest, fostered by this magazine.

**American Forests and Forest Life.** American Forestry Association, 1523 L St., N.W., Washington, D. C. \$4.00.

Monthly. Devoted to forestry and outdoor subjects.

**American Game.** 233 Broadway, New York City. \$1.00.

Monthly. Bulletin of American Game Protective Association. Illustrated. Material on wild life and its conservation.

**Asia.** 468 Fourth Ave., New York City. \$4.00.

Monthly. Very well illustrated Records of explorations, travel, native customs, animal and plant life, etc.

**Bell Telephone News.** Illinois Bell Telephone Co., Chicago, Ill. Free.

Monthly. Intended for telephone employees in Illinois, Wisconsin, and Indiana. Schools of those states can probably obtain this material free. Articles on telephone subjects.

**Bird Lore,** Harrisburg, Pa. \$1.50.

Bi-monthly. Official organ of the Audubon Society. Good material.

**The Chemistry Leaflet.** State College, Pa. \$1.75; reduced rates in quantity.

Weekly, during the school year. "A publication especially designed to interest the student of elementary chemistry."

**Chicago Engineering Review.** L. L. Cooke School of Electricity, 2154 Lawrence St., Chicago, Ill. Free.

A monthly of about 24 pages. Intended for students and graduates of this school. A great deal of valuable information concerning new electrical developments.

**Children's Museum News.** The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y. Free to schools.

Monthly. An illustrated record of the work of the Brooklyn Children's Museum, with lists of lectures and other activities.

**Cleanliness Journal.** The Cleanliness Institute, 45 East 17th St., New York City. Free.

This little magazine, which is published occasionally, contains valuable information concerning sanitation and similar topics.

**The Council Ring.** Brooklyn Council, Boy Scouts of America, 201 Montague St., Brooklyn, N. Y. 25c.

Weekly. Four pages. Chiefly news of scout activities, including an interesting department called "The Amateur Biologist."

**Current Science,** 1123 Broadway, New York City. 80c per year in clubs of 5 or more; 70c in club orders of 100 or more.

A weekly of 4 pages. An excellent magazine for class use. Notebook cover furnished to each subscriber.

**Discovery.** Bouverie House, Fleet St., E. C. 4, London, Eng. 12s. 6d.

"A monthly popular journal of knowledge." Latest scientific developments written up in a vivid way. Many geographical topics.

**The Edison Monthly.** The New York Edison Co., 130 East 15th St., New York City. Free.

A monthly of about 42 pages. Deals with the use of electricity in modern buildings, etc. Also contains articles of general or historical interest.

**Educational Foundations,** 10 Beaver St., Albany, N. Y. \$1.50 a year.

Descriptions of "Model Stores" and other exhibits prepared for schools.

**Girl Scout Leader**, 670 Lexington Ave., New York City. Free.

Monthly. Of some value in nature study. Free to organization officials. Teachers can probably secure it without cost.

**Gleanings in Bee Culture**. A. I. Root Co., Medina, Ohio. \$1.00 for two years.

Monthly. Many illustrations. Articles in this limited but very interesting field.

**Good Health**. Good Health Publishing Co., Battle Creek, Mich. \$2.50.

Monthly. Subtitled "The Battle Creek Journal of Health and Hygiene." Illustrated. Dietary propaganda.

**The Guide to Nature**, Sound Beach, Conn. \$1.50.

Monthly. Published by the Agassiz Association. Good for nature study.

**Handbook for Boys**. Boy Scouts of America, 2 Park Ave., New York City. 40c.

An annual publication with considerable material for the biology teacher.

**Hobbies**. Buffalo Society of Natural Sciences, Public Library Bldg., Buffalo, N. Y. \$1.00.

Monthly. Devoted to nature study, gardening, etc.

**Hygeia**, 535 North Dearborn St., Chicago, Ill. \$3 00.

Monthly. Publication of the American Medical Association devoted to teaching the doctrine of better health.

**Kodakery**. Eastman Kodak Co., Rochester, N. Y. 60c.

Monthly. A journal for amateur photographers. Teachers can probably obtain it free.

**The Literary Digest**. 354 Fourth Ave., New York City. \$4.00.

Weekly. Although a general periodical, it contains a department on "Science and Invention" which is very valuable as reference material for pupils in all the high school science courses.

**The Mentor**. Mentor Association, 114 East 16th St., New York City. \$4.00.

Monthly. An occasional article on science subjects, well illustrated.

**Milk**, 234 South Wells St., Chicago, Ill. Free.

This is a monthly information sheet relating to the production and distribution of fresh milk.

**National Geographic Magazine**. National Geographic Society, Hubbard Memorial Hall, Washington, D. C. \$3.50.

Monthly. Wonderfully illustrated. Occasional science articles.

**National Humane Review**, 80 Howard St., Albany, N. Y. \$1.00; 75c to teachers and pupils.

Monthly. Illustrated. Emphasizes kindness to animals.

**Natural History**. American Museum of Natural History, 77th St. and Central Park West, New York City. \$3.00.

Bi-monthly. Illustrated. Reports of the work of the Museum, which includes all science fields.

**Nature Magazine**. American Nature Association, 1214 Sixteenth St., N.W., Washington, D. C. \$3.00.

Monthly. A good magazine for nature study reference work in biology.

**New England Telephone Topics**. New England Telephone and Telegraph Co., Boston, Mass. Free.

Monthly. Intended for employees of this company, but schools in the vicinity can probably also obtain it. Some articles each month on telephone topics.

**News Bulletin of the Chicago Academy of Sciences**. Lincoln Park at Clark and Center Sts., Chicago, Ill. Free.

A 4-page illustrated leaflet issued six times a year, giving news of lectures and field trips, and other items of similar interest.

**Outdoor America**. Izaak Walton League of America, 536 Lake Shore Drive, Chicago, Ill. \$1.00.

Monthly. To promote conservation, to urge outdoor sports and recreation, to oppose pollution of streams and coastal waters, etc.

**Pacific Telephone Magazine**. Pacific Telephone and Telegraph Co., San Francisco, Calif. Free.

Monthly. For employees, but can probably be obtained free for schools in California and surrounding states. Articles on telephone topics.

**Photo-Era.** Photo-Era Publishing Co., Wolfeboro, N. H. \$2.50.

Monthly. Discussions of the principles of photography, news, hints for amateurs, book reviews, and many excellent reproductions of photographs.

**Popular Astronomy.** Goodsell Observatory of Carleton College, Northfield, Minn. \$4.00.

Monthly, except July and September. A review of astronomy and applied sciences. About 74 pages each issue.

**Popular Chemistry.** Popular Chemistry Co., Swedesboro, N. J. \$1.00.

A valuable little magazine of about 16 pages. Good for project material. Monthly.

**Popular Mechanics Magazine.** Popular Mechanics Co., 200 East Ontario St., Chicago, Ill. \$2.50.

Monthly. For general reading and reference. Profusely illustrated.

**Popular Science Monthly.** Popular Science Publishing Co., 250 Fourth Ave., New York City. \$2.50. (Quantity rate of 15c a copy for classroom use.)

Monthly. Excellent for general reading. Has several good feature articles each month.

**Power.** McGraw-Hill Co., Inc., Tenth Ave. and 36th St., New York City. \$2.50.

Weekly. Mechanical devices and application of power.

**Radio Broadcast.** Doubleday, Doran and Co., Inc., Garden City, N. Y. \$4.00.

Monthly. One of the best radio magazines.

**Radio News.** Experimenter Publishing Co., 230 Fifth Ave., New York City. \$2.50.

Monthly. Many radio suggestions. One of the most popular radio magazines.

**Safeguarding America Against Fire.** National Board of Fire Underwriters, 85 John St., New York City. Free.

Facts concerning losses from fires, their causes and prevention, which may be reprinted in local papers.

**Safety Bulletin.** Bureau of Safety, 79 West Monroe St., Chicago, Ill. Free.

Monthly. General material on this important topic.

**Safety Education.** The Education Division of the National Safety Council, 1 Park Ave., New York City. \$1.00.

Monthly, except July and August. A magazine of 20 pages, devoted to accident prevention. "A magazine of the Good Adventure."

**Science and Invention.** Experimenter Publishing Co., 230 Fifth Ave., New York City. \$2.50.

Monthly. Quite good. More sensational science than some of the other magazines.

**Science News-Letter.** Science Service, Inc., 21st and B Sts., N.W., Washington, D. C. \$5.00. (Quantity price of 5c a copy for classroom use.)

Issued weekly. Gives an excellent survey of current happenings in the science fields. Each article classified into the main science which it represents.

**Scientific American.** Scientific American Publishing Co., 24 West 40th St., New York City. \$4.00.

Monthly. An excellent publication. Feature articles written by leading scientists, and of sufficient length to make valuable references.

Also a yearly publication which reviews current progress in Science and Industry, assembling in convenient form scientific data from many sources, called the "Annualog." A very valuable reference. \$1.50, postpaid.

**Scouting.** National Council, Boy Scouts of America, 2 Park Ave., New York City.

Monthly. Nature study material. Free to scout officials, and probably to school libraries.

**Telephone Almanac.** American Telephone and Telegraph Co., 195 Broadway, New York City. Free.

A yearly publication enumerating important events of telephone history under the anniversary dates.

**Travel.** National Travel Club, 7 West Sixteenth St., New York City. \$4.00.

A monthly magazine sponsored by a society devoted to the "promotion of public matters relating to travel, to the spread of geographic knowledge, and to the fostering of a spirit of brotherhood among travelers."

**Transmitter.** Chesapeake and Potomac Telephone Co., 725 13th St., N.W., Washington, D. C. Free.

For telephone employees, but can probably be obtained by schools of that region. Telephone topics.

**Tycos.** Taylor Instrument Co., Rochester, N. Y. Free.

Quarterly. A 38-page magazine, containing much material of interest to students while studying topics on heat and the weather.

**Washington Bureau,** 1322 New York Ave., N.W., Washington, D. C.

A news service available to newspapers, schools, etc. Write for particulars and rates.

**Yosemite Nature Notes.** Yosemite National Park, Calif. \$2.00.

Monthly. Good nature study material, as showing the forces of nature at work in a great national park.

### C. TECHNICAL SCIENTIFIC MAGAZINES

**A C F Transportation News.** American Car and Foundry Co., 30 Church St., New York City. Free.

A monthly magazine devoted to the dissemination of news concerning railroads.

**American Journal of Public Health,** 372 Broadway, Albany, N. Y. \$5.00.

Monthly. Organ of American Public Health Association. Teaches better public health habits.

**American Naturalist.** Science Press, Grand Central Terminal, New York City. \$5.00.

Bi-monthly. Devoted to the biological sciences in general and nature in particular.

**American Photography,** 428 Newbury St., Boston, Mass. \$2.50.

Monthly, established in 1889. A well-known magazine on the subject of photography.

**Asbestos.** Secretarial Service, 246 North 17th St., Philadelphia, Pa. \$2.00.

Monthly. Asbestos and magnesia are the main topics considered.

**Astrophysical Journal.** University of Chicago Press, Chicago, Ill. \$6.00.

Monthly, except February and August. The only journal devoted to astrophysics and spectroscopy.

**The Auk.** Academy of Natural Sciences, Philadelphia, Pa. \$3.00.

Quarterly. Organ of the American Ornithologists Union.

**Bakelite Information.** Bakelite Corp., 247 Park Ave., New York City. Free.

Monthly. Some articles of value. Shows use of bakelite in many articles of commerce.

**Bausch and Lomb Magazine.** Bausch and Lomb Optical Co., Rochester, N. Y. Free.

Monthly. About 16 pages. Devoted largely to sale of Bausch and Lomb lenses for eyeglasses.



**Bell Laboratories Record.** Bell Telephone Laboratories, Inc., 463 West St., New York City. Free.

Monthly of about 40 pages. Contains the latest information concerning the activities of this research organization. Intended for members of the staff, but can probably be obtained free by schools in or near New York.

**Biological Abstracts.** University of Pennsylvania, Philadelphia, Pa. \$9.00.

Thirteen numbers a year. Of value to the biology teacher. Reviews and abstracts important literature in this field.

**Botanical Gazette.** University of Chicago Press, Chicago, Ill. \$9.00.

Illustrated monthly (not published in July, August, January, and February). Good for teacher reference.

**Bryologist,** 18 West 89th St., New York City. \$1.25.

A monthly magazine devoted to the study of mosses.

**Bulletin of the New York Zoölogical Society,** 101 Park Ave., New York City. \$1.50.

Bi-monthly. Public zoölogical parks, public aquariums, preservation of native animals, and field notes are among topics treated.

**Bulletin of the Torrey Botanical Club,** Columbia University, New York City. \$4.00.

A large illustrated monthly. Technical, but of value to the skilled teacher.

**Chemical Abstracts,** 1709 G St., N.W., Washington, D. C. \$7.50.

Semi-monthly. Organ of the American Chemical Society.

**Chemical and Metallurgical Engineering.** McGraw-Hill Co., Tenth Ave. and 36th St., New York City. \$4.00.

Monthly. Showing many applications of chemistry and physics in industry.

**Child Health Bulletin,** 370 Seventh Ave., New York City. Included with \$2.00 membership.

Bi-monthly. Publication of American Child Health Association designed to teach better health habits.

**Concrete Products**, Monadnock Bldg., Chicago, Ill. \$1.00.

Monthly. Of some value, as showing the many and varied uses of concrete.

**Domestic Engineering**, 1900 Prairie Ave., Chicago, Ill. \$2.00.

Monthly. Plumbing and heating topics. Helpful in study of home appliances.

**Dyestuffs**. National Aniline Chemical Co., 40 Rector St., New York City. Free.

Monthly. Uses of dye for paper, textiles, leather, etc.

**Electragist**, 15 West 37th St., New York City. \$2.00.

Monthly. Organ of Association of Electragists. Probably obtainable free by teachers.

**Electricity on the Farm**. Farm Light and Power Publishing Co., 225 West 34th St., New York City. 75c a year. Special rates for quantities.

Monthly. Illustrated. Distributed through many power companies. Excellent practical information in this restricted field.

**Evolution**, 96 Fifth Ave., New York City. \$1.00.

Monthly. "A journal of nature to combat bigotry and superstition, and develop the Open Mind by popularizing Natural Science."

**Facts About Sugar**, 135 Front St., New York City. \$3.00.

Weekly. Articles on sugar production, refining, and use.

**General Electric Review**, Schenectady, N. Y. \$3.00.

A technical monthly of about 48 pages. Excellent for teacher reading on the latest developments in electricity and its applications in many fields.

**Geographical Review**. American Geographical Society, Broadway at 156th St., New York City. \$5.00.

A quarterly journal which carries important contributions to a knowledge of geography, especially the social aspects of the subject.

**How to Live**. Life Extension Institute, 25 West 43rd St., New York City. \$1.00.

A monthly journal designed to assist toward better living through a knowledge of health and hygiene.

**The Indicator.** American Chemical Society, 52 East 41st St., New York City. Free to chemistry teachers.

Monthly. Published jointly by the New York and New Jersey sections of the American Chemical Society for members. Carries news of meetings, lectures, and educational work in this field.

**Industrial and Engineering Chemistry,** 19 East 24th St., New York City. \$7.50.

Monthly. Organ of American Chemical Society. Shows scope of applied chemistry.

**Industrial Gas.** Robbins Publishing Co., 9 East 38th St., New York City. \$2.00.

A monthly of about 36 pages. "A magazine for all who use heat in industry."

**Industrial Power,** 440 South Dearborn St., Chicago, Ill. Free.

Monthly. Devoted to mechanical and industrial topics.

**Irrigation and the New West Sugar Beet Journal,** 433 California St., San Francisco, Calif. \$2.00.

Monthly. The title explains the nature of the magazine.

**Journal of American Institute of Electrical Engineers,** 33 West 39th St., New York City. \$10.00.

Monthly. Presents many phases of this engineering profession.

**Journal of Geography.** A. J. Nystrom and Co., 2249 Calumet Ave., Chicago, Ill. \$2.50.

Monthly (9 months). Of value for general science. Published by the National Council of Geography Teachers.

**Journal of Social Hygiene,** 27 Columbia St., Albany, N. Y. \$3.00.

Monthly (9 months). American Social Hygiene Association publication.

**Lubrication.** The Texas Co., 17 Battery Pl., New York City. Free.

Monthly of 12 pages. "A technical publication devoted to the selection and use of lubricants."

**Measurement.** The Metric Association, 156 Fifth Ave., New York City. 5c single copy.

Quarterly, of about 16 pages. Valuable in teaching the metric system.

**Mechanical Engineering**, 29 West 39th St., New York City. \$5.00.

Monthly. Organ of American Society of Mechanical Engineers.

**Medical Progress**. American Association for Medical Progress, Inc., 370 Seventh Ave., New York City. \$1.00.

Quarterly. A magazine of about 16 pages, designed to diffuse an understanding of research methods in medical science.

**Mine and Quarry**. Sullivan Machinery Co., 122 South Michigan Ave., Chicago, Ill. Free.

Quarterly. Information concerning tools and machinery in these industries.

**The Monthly Evening Sky Map**. Leon Barritt, 367 Fulton St., Brooklyn, N. Y. \$1.50.

Offers opportunity for projects on stars. Shows, in clear fashion, the location of important stars, etc.

**National Electric Light Association Bulletin**, 29 West 39th St., New York City. \$3.00.

Monthly. Deals with use of electric light and power in modern life.

**Oil-Power**. Standard Oil Co., 26 Broadway, New York City. Free.

Monthly. Devoted chiefly to lubrication problems. Illustrated. Interesting material.

**Physical Review**, Corning, N. Y. \$7.00.

Monthly. Organ of the American Physical Society. Articles too technical for general use.

**Quarterly Review of Biology**. Williams and Wilkins Co., Baltimore, Md. \$5.00.

Important papers on biological topics. Especially valuable is the extensive book review section.

**Rhodora**, 300 Massachusetts Ave., Boston, Mass. \$2.00.

Monthly of about 250 pages. Organ of the New England Botanical Club.

**Science**. Science Press, Grand Central Terminal, New York City. \$6.00.

Weekly. Good material for teachers of science. Included with membership in American Association for the Advancement of Science.

**Scientific Monthly.** Science Press, Grand Central Terminal, New York City. \$5.00.

Monthly, illustrated. Devoted to the diffusion of scientific knowledge.

**Scientific Periodicals.** B. Login and Son, 29 East 21st St., New York City.

A book store specializing in complete files of magazines, volumes, or individual copies, especially scientific publications.

**Scientific Temperance,** Westerville, Ohio. \$2.00.

Quarterly. Scientific Temperance Federation publication. Of some value in general science and biology.

**Silicate P's and Q's.** Philadelphia Quartz Co., Philadelphia, Pa. Free.

Monthly. A single sheet containing information regarding the use of silicates of soda.

**Skelly News.** Skelly Oil Co., Tulsa, Okla. Free to schools.

Monthly. Interesting facts about oil wells and refineries. Illustrated.

**Stain Technology.** H. J. Conn, Lock Box 299, Geneva, N. Y. \$1.50.

Quarterly. Of some value in chemistry. Intended for technicians in preparing microscopical slides.

**Starry Cross,** 3243 Chestnut St., Philadelphia, Pa. \$1.00.

Monthly. Journal of American Anti-Vivisection Society. Teaches kindness to animals, without regard to human needs.

**Technical News Bulletin.** Bureau of Standards, Washington, D. C. 25c.

Monthly. Of general interest. Supplies brief science items suitable for publication in other periodicals.

**Telephone Review.** New York Telephone Co., New York City. Free.

Monthly. A publication designed for the employees of the above company. Contains each month several articles of interest to students. Circulation on free basis probably restricted to New York and vicinity.

**The Texaco Star.** The Texas Co., Houston, Texas. Free.

Monthly. 32 pages. For employees, but in many cases can be obtained free. Has articles on petroleum and oil.

**Torrey.** Torrey Botanical Club, Columbia University, New York City. \$1.00.

Illustrated bi-monthly. Devoted to botanical subjects.

**Tree Talk.** Tree Talk Publishing Co., Stamford, Conn. \$1.00.

Small quarterly publication devoted to arboreal topics.

**The Weather Vane.** Carrier Engineering Corp., Transportation Bldg., Chicago, Ill. Free.

Monthly. Humidity, temperature, air supply, and other ventilation topics.

**Wild Flower.** Wild Flower Preservation Society, 3740 Oliver St., N.W. Washington, D. C. \$1.00.

Quarterly. Strikes a note that needs sounding if our wild flowers are to be saved.

**POPULAR AND TECHNICAL SCIENTIFIC MAGAZINES.** (Add other materials in space below.)

## XVI. BIBLIOGRAPHIES

The choice of books in science is difficult because of the very abundance from which to select. Poor selection has filled many shelves with practically useless books. As Dr. H. A. Webb has so well stated the matter, "In many high school libraries the word *science* has implied the technical, as exemplified in physical or botanical works offering classified, rather than stimulating, knowledge. . . . For many general readers, and particularly for young people, the latter type is perhaps the more desirable." It is not the aim in this section to do more than open up sources of guidance to be found in the excellent bibliographies of science already issued, notably the one by Dr. Hanor A. Webb; and to name lists of publications and the outstanding works of reference in science which are valuable for the high school library. There is a division, also, on books concerning the teaching of science. No attempt is made to list textbooks or courses of study.

In a number of cases, the prospectus supplied by the publisher of a reference set provides excellent teaching aids in the form of colored plates and other specimen pages.

No high school library or science department would consider purchasing all the reference books listed in the first division of this section. Of the sets there are perhaps not over half a dozen that would be frequently used. Certain individual volumes from the series and other books listed will be found very helpful in the work of science classes. There is a tendency for the classroom in all subjects to become a combined library and laboratory; this is especially true in science. Teachers should cooperate with librarians in preventing the undesirable form of initiative at times manifested when pupils mutilate books of reference to obtain illustrations or tables for some assignment or class report.

To keep up to date concerning science books suitable for high school use, the teacher may well read the book reviews in such magazines as *Current Science*, *The Science Classroom*, and *Science News-Letter*. (See preceding section, *PERIODICALS*.)

## A. SELECTED BOOKS OF REFERENCE

## Sets

**The American Educator.** Ralph Durham Co., Publishers, 4750 Sheridan Road, Chicago, Ill.; or Educator Service Corp., Fifth Ave. at 46th Street, New York City. 8 Vols. \$43.00.

Organized like an encyclopedia. Illustrated. Full index in last volume. Also, "Book of Rural Life." 10 Vols. \$79.50.

**Book of Knowledge.** Grolier Society, 2 West 45th St., New York City. 20 Vols. \$69.50.

Arranged by topics, profusely illustrated. Wide range of knowledge interestingly presented for all ages.

**The Book of Wonders.** Bureau of Industrial Education, Woodward Bldg., Washington, D. C. 2 Vols. \$7.00.

Treats chiefly of the many applications of science in modern life.

**The Classroom Teacher.** 104 South Michigan Ave., Chicago, Ill. 12 Vols. \$59.50.

Index in separate volume. Arranged by grades and by subjects. Volume 9 is chiefly on junior high school science; sections in other volumes also on science.

**Compton's Pictured Encyclopedia.** F. E. Compton and Co., Chicago, Ill., or 19 West 44th St., New York City. 10 Vols. 1928. \$69.50.

Interesting explanations, accompanied by pictures that illustrate the point well. Quite reliable and accurate. Excellent biographical articles. Exceptionally popular with students. Every high school and science library should have a copy.

**The Human Interest Library.** The Midland Press, Chicago, Ill. 5 Vols. \$29.75.

Arranged by large topics. Very fully illustrated. Index in each volume.

**The New Students Reference Work.** S. L. Weedon Co., 2036 East 89th St., Cleveland, Ohio. 8 Vols. \$41.75. Annual supplement \$1.00.

First six volumes arranged like an encyclopedia. Many illustrations. "The How and Why of Common Things" is the title of the last two volumes. Wide range of topics. Excellent illustrations, some in color.



**Perpetual Loose-Leaf Encyclopedia.** Thos. Nelson & Sons., 381 Fourth Ave., New York City. 12 Vols. and an index volume. \$126.00.

Kept up to date by sheets issued every six months.

**World Book.** W. F. Quarrie and Co., 154 East Erie St., Chicago, Ill. 10 Vols. \$57.00.

An encyclopedia Subtitle: "Organized knowledge in story and picture." A very useful school reference work. Many illustrations. Supplementary features: "Outlines for reading and study," with page references. An annual loose-leaf supplement, 50c a year. Also a booklet, "Projects and Problems"—a series of classroom studies based on World Book, 50c.

**Book of Popular Science.** Grolier Society, 2 West 45th St., New York City. 15 Vols. \$59.50.

Fully illustrated, well indexed. The stories of invention, exploration, and discovery interestingly told. Good biographical sections.

**A Little Gateway to Science.** Little, Brown and Co., 34 Beacon St., Boston, Mass. 75c each.

A brief series of elementary nature studies.

**Outline of Science.** J. Arthur Thomson. G. P. Putnam's Sons, 2 West 45th St., New York City. 1922. 4 Vols. \$18.00.

Over 800 illustrations, 40 in color. This set delves into all the fields of science, but in every case with some definite and interesting goal in mind. A most valuable set.

**Popular History of American Invention.** Waldemar Kaempfert. Chas. Scribner's Sons, 597 Fifth Ave., New York City. 1924. 2 Vols. \$10.00.

Much valuable information which it is difficult to find elsewhere.

**Wonders of the Past.** G. P. Putnam Co., 2 West 45th St., New York City. 4 Vols. \$20.00.

The marvels of vanished civilization. Lavishly illustrated.

**Wonders of Science in Modern Life.** Funk and Wagnalls, 354 Fourth Ave., New York City. 10 Vols. \$5.00.

Some of the subjects treated are: "How Work Is Done," "The Animal Machine," and "Niagara in Harness."

**Little Nature Library.** Nelson, Doubleday Co., Garden City, N. Y. 4 Vols. \$7.50.

Volumes on Birds, Trees, Butterflies, and Wild Flowers. Beautifully illustrated. Excellent reference set.

**Library of Pioneering and Woodcraft.** Doubleday, Page and Co., Garden City, N. Y. 6 Vols. \$11.00.

Written by Ernest Thompson Seton. Source book of all kinds of nature lore

**The Nature Library.** Doubleday, Page and Co., Garden City, N. Y. 6 Vols. \$19.50.

Separate volumes on Birds, Wild Flowers, Trees, etc. Many colored plates.

**Nature Lovers Library.** The University Society, 468 Fourth Ave., New York City. 6 Vols. \$32.50.

Richly illustrated in color. Facts interestingly presented.

**Nature Neighbors.** Joseph H. Dodson Co., Kankakee, Ill. 11 Vols. \$47.50.

A set published by the American Audubon Association, with individual volumes on Birds, Plants, Animals, Minerals. The set contains 648 full-page colored plates.

**The New Natural History.** J. Arthur Thomson. J. P. Putnam's Sons, 2 West 45th St., New York City. 3 Vols. \$18.00.

Nothing is more fascinating than facts simply told. "Truly described as the 'romance of Nature's wonderland,' these volumes are outstanding in beauty and charm. Even an illiterate person would look through them with amazement, entranced by the 47 full-page color plates and more than 1,500 photographs. An educated person would become absorbed, and an alert child—we believe—positively hypnotized. There are 68 chapters and 1152 text pages. While the flavor of the books is English, yet Nature extends over all the world, and no interesting habitation of plant or animal life has been neglected."—H. A. Webb.

**The Cambridge Natural History.** Macmillan Co., 60 Fifth Ave., New York City. 10 Vols. \$7.00 each volume.

Not a set with colored plates and popular discussions, but a systematic review of all the groups in the animal kingdom, arranged in taxonomic order. Many illustrations. A similar set is "A Treatise on Zoölogy," edited by E. Ray Lankester; also from Macmillan Co. 8 vols. \$6.75 each.

**A Textbook of Zoölogy.** Parker and Haswell. Macmillan Co., 60 Fifth Ave., New York City. 3rd edition 1921. 2 Vols. \$12.50.

This standard college text is about the best reference work on the morphology of animal types that can be placed in a high school library.

**World of To-day.** G. P. Putnam's Sons, 2 West 45th St., New York City. 4 Vols. \$20.00, less 10% to teachers.

Primarily a geography encyclopedia, describing each country in detail.

### Series

**Century Books of Useful Science.** The Century Co, 353 Fourth Ave., New York City. \$3.00 each.

Includes "Creative Chemistry" by Slosson; "Artificial Light" by Luckiesh; etc.

**Every-Child-Should-Know Series.** Grossett and Dunlap, 1140 Broadway, New York City. \$1.15 a volume, postpaid.

In this series there are science numbers, such as "Birds" by Neltje Blanchan, "Trees" by Julia Ellen Rogers, "Water Wonders" by Jean M. Thompson.

**Everyman's Library.** E. P. Dutton and Co., 681 Fifth Ave., New York City. Cloth, 80c each.

Science classics included:

- No. 10—"Essays of Francis Bacon."
- No. 719—Bacon, "Advancement of Learning."
- No. 104—Darwin, "Voyage of the Beagle."
- No. 576—Faraday, "Experimental Researches in Electricity."
- No. 262—Harvey, "Motion of the Heart and Blood."
- No. 47—Huxley, "Man's Place in Nature."
- No. 498—Huxley, "Lectures and Lay Sermons."
- No. 700—Lyell, "The Antiquity of Man."
- No. 282—Ruskin, "Ethics of the Dust."
- No. 504—Spencer, "Essays."
- No. 48—White, "Natural History of Selborne."

**Field Books.** G. P. Putnam's Sons, 2 West 45th St., New York City. \$3.50 each.

A series including "Field Book of Insects" by Lutz, "Field Book of Wild Flowers" by Mathews, "Guide to the Mammals" by H. E. Anthony, etc.

**Handbook Series.** American Museum, 77th St. and Central Park West, New York City. Various prices.

Includes "Fishes of the New York City Region" by Nichols, 75c; "Animals of the Past" by F. A. Lucas, 200 pp., illustrated, 75c; and other works.

**Home University Library of Modern Knowledge.** Henry Holt and Co., 1 Park Ave., New York City. \$1.00 a volume.

This series includes several numbers on the sciences, such as "An Introduction to Science" by J. Arthur Thomson, "The Principles of Physiology" by J. G. McKendrick, "The Origin and Nature of Life" by Benjamin M. Moore, and others.

**Humanizing-of-Knowledge Series.** Doubleday, Doran Co., Garden City, N. Y. \$1.00 and \$1.25.

Included in the series are: Bazzoni's "Kernels of the Universe"; Shapley's "Starlight"; and other similar works.

**Library of Modern Sciences.** D. Van Nostrand Co., 8 Warren St., New York City. \$3.00 each.

The books in this series are outstanding contributions to the dissemination of recent authoritative facts of science. It includes Lee, "Stories in Stone"; Arrhenius, "Chemistry in Modern Life"; Luckiesh, "Foundations of the Universe"; Abbot, "The Earth and the Stars"; etc. Write for free booklet, "The World of Fact."

**Little Books of Modern Knowledge.** Doubleday, Doran Co., Garden City, N. Y. 75c each.

Included in this series are "Man in the Making," by R. R. Maett, and other similar works.

**Modern Readers Bookshelf.** Doubleday, Doran Co., Garden City, N. Y. \$1.50 each.

Includes "Everyday Biology" by J. Arthur Thomson; "Atoms and Electrons" by J. N. W. Sullivan; etc.

**Modern Science Series.** Harper and Brothers, 49 East 33rd St., New York City. \$3.00.

Includes the "Ways of Life" by Richard Swann Lull; "Why We Behave Like Human Beings" by George A. Dorsey; "Concerning the Nature of Things" by Sir William Bragg; "Everyman's Chemistry" by Ellwood Hendrick; and others.

**Nature Library.** Doubleday, Doran Co., Garden City, N. Y. \$4.00 and \$5.00 a volume.

Fully illustrated. Includes "Tree Book," "Mushroom Book," "Frog Book," "Reptile Book," and many others.

**Pocket Nature Library.** Doubleday, Page and Co., Garden City, N. Y. \$1.25 each.

A series of field guidebooks for Wild Flowers, Birds, Butterflies, etc.

**Popular Research Narratives.** Vol. I, 1924. Vol. II, 1926. The Engineering Foundation, 29 West 39th St., New York City. 50c and \$1.00.

In each volume there are 50 brief stories of discovery, invention, and research told in everyday language for young and old by the "men who did it."

**Practical Book Series.** Harper and Bros., 49 East 33rd St., New York City. \$2.00 each.

Includes "Outdoor Book for Boys," "Electricity Book for Boys," etc.

**Roadmaker Series.** Small, Maynard and Co., Boston, Mass. \$1.75 each.

Includes biographies of Bacon, Lister, Watt, Faraday, etc.

**The Romance Series.** J. B. Lippincott Co., Washington Square, Philadelphia, Pa. \$3.00 each.

This series of 37 volumes includes Selous's "Romance of Insect Life"; Gibson's "Romance of Coal"; Ealand's "Romance of the Microscope"; etc.

**Star Series.** Garden City Publishing Co., Garden City, N. Y. \$1.00 each.

Includes the biography of Pasteur by Vallery-Radot, etc.

**"Tell-Me-How" Series.** Harper and Bros., 49 East 33rd St., New York City. \$1.50 each.

Includes "Aircraft Book," "Wireless Book," and others of a similar nature.

**Things-to-Know Series.** Harper and Bros., 49 East 33rd St., New York City. \$1.00 each.

Includes "The Stream of Life" by Julian Huxley; "Nature of Man" by George A. Dorsey; and others. These little books are exceptionally successful in giving the most recent knowledge in an interesting and understandable manner.

**To-day and To-morrow Series.** E. P. Dutton and Co., 681 Fifth Ave., New York City. \$1.00 each.

Includes "Icarus" by Bertrand Russell, "Daedalus" by Haldane, "Tantalus" by Schiller, etc.

**Romance of Science Series.** John C. Winston Co., 1006 Arch St., Philadelphia, Pa. 80c each.

These books by DuPuy are interesting stories of the relationships between the insects, birds, and animals that are friends and foes of man.

### Single Volumes

**How to Use the Dictionary.** M. C. Flaherty. Ronald Press, 20 Vesey St., New York City. 1923. \$1.25.

A guide to the intelligent use of the wealth of information in standard dictionaries.

**The Value of the Dictionary.** G. & C. Merriam Co., Springfield, Mass. Free.

Explicit suggestions on what to look for in the dictionary and how to find it.

**Dictionary of Scientific Terms.** I. F. and W. D. Henderson. D. Van Nostrand Co., 8 Warren St., New York City. \$4.50.

A very complete dictionary of terms used in all the sciences. A valuable book for the teacher's desk.

**Dictionary of Botanical Equivalents.** E. Artschwager and E. M. Smiley. Williams and Wilkins, Baltimore, Md. \$2.00.

A French-English and German-English list of botanical terms.

**Dictionary of Chemical Terms.** J. F. Couch. D. Van Nostrand Co., 8 Warren St., New York City. \$2.50.

Good for the reference shelf in a large high school.

**French-English Dictionary for Chemists.** John Wiley and Sons, 440 Fourth Ave., New York City. \$3.00.

For anyone who reads scientific publications in French.

**Gould's Medical Dictionary.** P. Blakiston's Sons, 1012 Walnut St., Philadelphia, Pa. \$4.00.

A useful reference where there are many biology classes.

**Cyclopedia of Formulas.** Scientific American Co., 24 West 40th St., New York City. \$5.50 plus postage.

Grouped by subjects are 15,000 processes, formulas, etc., for the workshop and laboratory.

**Twentieth Century Book of Recipes, Formulas, and Processes.** Henley Press, 2 West 45th St., New York City. \$4.00.

Contains 10,000 household, workshop, and laboratory formulas, short-cuts, etc.

**Champlin's Young Folks Cyclopedia of Common Things.** Henry Holt and Co., 1 Park Ave., New York City. \$3.00.

"Covers about everything of interest to boys and girls in natural science and the useful arts." Also "Champlin's Young Folks Cyclopedia of Natural History."

**Lincoln Library of Essential Information** Frontier Press, Buffalo, N. Y. 1924. \$16.50.

"Intermediate between a cyclopedia and 'book of facts.' A surprising fund of information, some not easily found elsewhere. Quite the best one-volume work of general reference."—Librarian of Girard College.

**Outline of Man's Knowledge.** C. Wood. L. Copeland Co., 119 West 57th St., New York City. 1927. \$5.00.

The story of science, art, and philosophy as they course through the ages.

**The Wonderbook of Knowledge.** John C. Winston Co., 1006 Arch St., Philadelphia, Pa. \$2.50.

Many illustrations. Information on all sorts of topics.

**Adventures in Science.** Edited by W. H. Cunningham. Ginn and Co., 70 Fifth Ave., New York City. 72c.

Excellent readings from many sources. Also, "Selections from Huxley," 48c.

**Readings in Science.** Edited by John A. Lester. Houghton, Mifflin Co., Boston, Mass. 56c.

Classic essays on science topics, by leaders in science fields.

**The Education of the Consumer.** Henry Harap. Macmillan Co., 60 Fifth Ave., New York City. 1924. \$2.00.

A careful, detailed analysis of information concerning products which everybody uses, proposed as a basis for instruction.

**The Nature of the World and of Man.** H. H. Newman and others. University of Chicago Press, Chicago, Ill. 553 pp. 1926. \$5.00.

Many illustrations and diagrams. Excellent chapters on astronomy, origin of earth, atomic structure, chemical processes, origin of life, bacteria, and many phases of the evolutionary process. Excellent for teacher and superior student reference. If a general science teacher can have only one reference book on recent developments in all science fields, this is it. However, it is solid meat, not a short-cut to information.

**Science for All.** Ward, Lock & Co., Ltd., London. 384 pp. 1926. 6s.

Seven chapters in special science fields, each written by an authority. Well illustrated. Introduction by the President of the Royal Society.

**Pocket Guide to Science.** Popular Science Monthly, 240 Fourth Ave., New York City. With subscriptions, 50c additional.

Questions arranged by topics, and answered in brief, popular form.

#### BIOGRAPHY

Frequently a prospectus or other publisher's announcement is a very useful source of information concerning science biography. Examples:

**Arcturus Adventure, Beebe.** G. P. Putnam's Sons, 2 West 45th St., New York City. Free. Also others about this author.

**Dallas Lore Sharp.** Houghton, Mifflin Co., Boston, Mass. Free. Two leaflets, illustrated.

**Dutton Authors: W. H. Hudson.** E. P. Dutton and Co., 681 Fifth Ave., New York City. Free. Also another leaflet on his collected works.

**Ernest Seton Thompson.** Doubleday, Page and Co., Garden City, N. Y. Free.

**J. Henry Fabre.** Dodd, Mead, and Co., Fourth Ave. at 30th St., New York City. Free.



**Paul de Kruif.** Harcourt, Brace and Co., 383 Madison Ave., New York City. Free.

**Boyhood of a Naturalist.** John Muir. Houghton, Mifflin Co., Boston, Mass. 122 pp. 44c.

A number in the pocket-size Riverside Literature Series. 'The early experiences of the Scotch lad who grew up in Wisconsin and whose enthusiastic nature writings entitle him to be known as the "Thoreau of the West." Excellent reference.

**Far Away and Long Ago.** W. H. Hudson. E. P. Dutton Co., 681 Fifth Ave., New York City. \$2.00.

A fascinating autobiographical tale of the boyhood of this important naturalist of South America. Excellent for the reference shelf.

**From Immigrant to Inventor.** Michael I. Pupin. Chas. Scribner's Sons, 597 Fifth Ave., New York City. \$2.00.

The autobiography of a Serbian peasant lad who came to America in his teens, worked in an iron foundry, had his mind kindled by Tyndall's book, "Heat as a Mode of Motion," and is to-day one of the world's greatest inventors in the field of electro-dynamics.

**American Men of Science.** Edited by J. McKeen Cattell. Science Press, Grand Central Terminal, New York City. 1927. \$10.00.

An extensive "Who's Who of American Scientists."

**A Century of Industrial Progress.** Edited by F. W. Wile. The American Institute, 250 West 57th St., New York City. 1928. \$5.00.

Each of the 30 chapters is written by a specialist in some field of science or industry.

**Eminent Chemists of Our Time.** Benjamin Harrow. D. Van Nostrand Co., New York City. \$2.50.

Gives a clear impression of personalities and an explanation of the contribution of each. Includes Mendeleeff, van't Hoff, Arrhenius, Remsen, and others.

**Boys Own Book of Great Inventions.** F. L. Darrow. Macmillan Co., 60 Fifth Ave., New York City. 1923. \$1.00.

Excellent material. The story of many important inventions presented with interesting details.

**Heroes of Progress.** E. M. Tappan. Houghton, Mifflin Co., Boston, Mass. \$1.25; school edition, 88c.

Brief stories of American leaders. Contains material difficult to find elsewhere. Well and accurately written. Includes Audubon, Agassiz, Burbank, Edison, Peary, and twenty-four others.

**Heroes of Science.** C. R. Gibson. J. B. Lippincott and Co., Philadelphia, Pa. 344 pp. 1912. \$1.50.

Illustrated. An account of lives, sacrifices, etc., that have made for scientific progress.

**Heroes of To-day.** M. R. Parkman. The Century Co., 353 Fourth Ave., New York City. \$1.75.

Illustrated with photographs. Includes Muir, Burroughs, Trudeau, Goethals, Langley, and others.

**Introduction to the History of Science.** Walter Libby. Houghton, Mifflin Co., Boston, Mass. 1917. \$2.35.

"Designed for youths from 17 to 22 years of age. Comprehensive, beginning with Egypt and Babylonia and tracing the story through Greece, Rome, and the Middle Ages, down to the day of germs, radium, and aeroplanes."

**Masters of Science and Invention.** Harcourt, Brace and Co., 383 Madison Ave., New York City. 1923. \$1.75.

Brief biographies of a number of scientists. A valuable reference book.

**The New Order of Sainthood.** Henry Fairfield Osborn. Chas. Scribner's Sons, 597 Fifth Ave., New York City. 50c

This brochure is a fitting tribute to Pasteur. Similar to it are "Huxley and Education" and "Evolution and Religion," \$2.00 each. The latter includes a practical chapter on how to teach evolution in the schools.

**Romance of Scientific Discovery.** C. R. Gibson. J. B. Lippincott Co., Washington Square, Philadelphia, Pa. \$3.00.

"A popular, clearly presented, and accurate account of some of the most noteworthy discoveries in the various fields of science."

**Short History of Science.** Sedgwick and Tyler. Macmillan Co., 60 Fifth Ave., New York City. 1917. \$3.00.

"Good for reference in the high school which can afford to buy a fairly extensive list."—F. D. Curtis.

**Stories of Scientific Discovery.** D. B. Hammond. Macmillan Co., 60 Fifth Ave., New York City. \$2.40.

"Brief, well-written sketches of the lives and work of a few of the greatest discoverers in the various branches of science." Includes Priestly, Lavoisier, Faraday, Fabre, Darwin, Pasteur, and others.

**The Stream of History.** Geoffrey Parsons. Chas. Scribner's Sons, 597 Fifth Ave., New York City. 1928. \$5.00

Another, and perhaps the best, attempt to compress all history into a single volume. The place of science is keenly appreciated, being given a clearer and more important exposition of its contribution than in other similar books.

**Creation by Evolution.** Edited by Frances Mason. Macmillan Co., 60 Fifth Ave., New York City. \$5.00.

Contributions by twenty-four eminent scientists. A consensus of present-day knowledge set forth by them in non-technical language that all may understand. Dedicated to those who seek facts as evidence and who find this search to be of inexhaustible interest.

**The New Universe.** Baker Brownell. D. Van Nostrand, Co., 8 Warren St., New York City. 455 pp. 1926. \$5.00.

In this single volume the author (Professor of Contemporary Thought at Northwestern University) gives a bird's-eye view of the contributions of all the sciences to our understanding "of the worlds in which we live." Valuable for reference in the high school library. Bibliography.

**Old Mother Earth.** Kirtley F. Mather. Harvard University Press, 51 Randall Hall, Cambridge, Mass. \$2.50.

A presentation of historical geology for the general reader, with illuminating illustrations.

**Possible Worlds.** J. B. S. Haldane. Harper and Bros., 49 East 33rd St., New York City. 1928. \$2.50.

A book of essays with the subtitle, "A Scientist Looks at Science." Very good reference, especially for biology classes.

**The A B C of Flight.** W. Lawrence Le Page. John Wiley and Sons, 440 Fourth Ave., New York City. \$1.50.

In accurate and readable language, this book attempts to show that flying is really very simple.

**Everybody's Aviation Guide.** Victor W. Page. Henley Press, 2 West 45th St., New York City. \$2.00.

Detailed knowledge in question and answer form.

**Letters of a Radio Engineer to His Son.** John Mills. Harcourt, Brace and Co., 383 Madison Ave., New York City. \$2.00.

A simple exposition of what electricity is and what it does in the radio. The best elementary account of the electron theory. Should be in every high school library.

**The Fundamental Concepts of Physics.** Paul R. Heyl. Williams and Wilkins Co., Baltimore, Md. \$2.00.

A review of the growth of recent concepts in physics. Good reference material.

**Getting Your Money's Worth.** Isabel E. Lord. Harcourt, Brace and Co., 383 Madison Ave., New York City. 1922. \$1.50.

Budgets, accounts, what and how to buy for the household. Very practical.

**Mechanical Devices in the Home.** Edith Allen. The Manual Arts Press, Peoria, Ill. \$1.75.

Forty-four chapters of practical information about nearly every kind of household appliance.

**Farm Products in Industry.** George M. Rommel. Rae D. Henkle Co., 45 Fourth Ave., New York City. 1928. \$3.50.

The report of a study of the utilization of farm wastes by industry. Exploration in a new field. The book is itself an experimental demonstration in that it is printed on paper made from corn stalks.

**Getting Well and Staying Well.** John Potts, M.D. Mosby Press, St. Louis, Mo. 223 pp. \$2.00.

This book, intended for the general reader, is valuable as a reference book in the high school library.

**Forty Notifiable Diseases.** Hiram Byrd. World Book Co., Yonkers, N. Y. Kraft paper; 74 pp. 60c.

"Sets forth those facts about communicable diseases that should be a part of the information possessed by every citizen. The language is simple and the principles those that a layman can understand."

**How to Live.** Irving Fisher and Eugene Lyman Fisk. Life Extension Institute, 25 West 43rd St., New York City. \$2.00.

Ventilation, food, exercises, colds, eugenics, and many other topics, treated from the standpoint of disease prevention and health based on modern science.

**Health Behavior.** Thomas D. Wood and Marion Olive Lerrigo. Public School Publishing Co., Bloomington, Ill. \$2.00.

A manual of graded standards of habits, attitudes, and knowledge conducive to the health of the physical organism, personality, home, and community.

**Preventive Medicine and Hygiene.** Milton J. Rosenau, M.D. D. Appleton and Co., 35 West 32nd St., New York City. 1926. 1,504 pp. \$10.00.

Personal hygiene, sanitation, the communicable diseases—a one-volume cyclopedia on these topics.

**How We Resist Disease.** Jean Broadhurst. J. B. Lippincott Co., Washington Square, Philadelphia, Pa. 1923. \$3.00.

A very valuable reference for any one teaching about communicable diseases.

**Light and Health.** M. Luckiesh and A. J. Pacini. Williams and Wilkins, Baltimore, Md. 1928. \$5.00.

Effect of light on human health and happiness. An interesting discussion of a relationship not often considered.

**Modern Science and People's Health.** Edited by Benjamin C. Gruenberg. American Association for Medical Progress, 370 Seventh Ave., New York City. \$2.50.

With magazine, "Medical Progress," and dues in the Association, \$3.50. Contributed to by leaders in medical research and medical education.

**The New Medical Follies.** Morris Fishbein. Boni and Live-right, 61 West 48th St., New York City. \$2.00.

An exposé of quacks and patent medicines.

**Elementary Bacteriology.** J. E. and E. A. O. Greaves. W. B. Saunders Co., Philadelphia, Pa. 506 pp. 1928. \$3.50.

Early notions about bacteria, the pioneers in this field, and the relation of these organisms to the life of man are treated in this new introductory text.

**Nutrition.** W. H. Eddy. Williams and Wilkins Co., Baltimore, Md. \$2.50.

An excellent antidote to any kind of food fad For laymen and students, but authoritative and down to date.

**A Guide to the Wild Flowers.** Norman Taylor. Greenberg, Publisher, 112 East 19th St., New York City. 1928. 357 pp. \$3.00.

This recent field book is exceptional in its inclusiveness and in its avoidance of technical terms. Over 1200 species are described, about half of which are shown by clear line-drawings. The author is a curator at Brooklyn Botanic Garden. Similar is the "Guide to the Trees" by C. C. Curtis. \$1.50.

**Fresh-Water Biology.** H. B. Ward and G. C. Whipple. John Wiley and Sons, 440 Fourth Ave., New York City. \$6.00.

This compendious volume about pond and stream life was contributed to by a number of specialists.

**Manual of Land and Fresh-Water Vertebrates of U. S.** H. S. Pratt. P. Blakiston's Sons, Philadelphia, Pa. 1923. \$6.00.

Illustrated. Does not include birds. Seeks by keys and descriptions to help the field naturalist identify his vertebrate specimens. By the same author is "Manual of the Common Invertebrates; Exclusive of Insects." Published by A. C. McClurg and Co., Chicago, Ill. 1916. \$5.00.

**Our Wild Animals.** E. L. Moseley. D. Appleton Co., 35 West 32nd St., New York City. \$1.20.

Contains illustrations and well-written descriptions of the common mammals of the United States, including their habits and relations to man.

**Practical Methods in Microscopy.** C. H. Clark. D. C. Heath and Co., Boston, Mass. \$3.00.

An elementary treatment of the subject, planned especially for beginners.

#### Dealers in Scientific Books

**Philip Dowell.** Catalog 5. Port Richmond, Staten Island, N. Y.

**Henry G. Fiedler.** Catalogs 25 and 26. 89 Chambers St., New York City.

**Foyles' Bookshop**, 121 Charing Cross, London, W. C. 2, England.

**T. H. McKenna**. Medical Books. 124 East 60th St., New York City.

**Preston and Rounds**. Botanical Books. Providence, R. I.

**John D. Sherman, Jr.** Books on Insects. 132 Primrose Ave., Mount Vernon, N. Y.

**G. E. Stechert & Co.** (Albert Hafner.) 31 East 10th St., New York City.

**REFERENCE BOOKS.** ( Add other materials in space below.)

## B. BOOKS ON THE TEACHING OF SCIENCE

**Digest of Investigations in the Teaching of Science.** F. D. Curtis. P. Blackiston's Sons, 1012 Walnut St., Philadelphia, Pa. 1926. \$2.50.

Divided into two sections are summaries of (a) Curriculum Studies and (b) Learning Studies. Many sources are made readily available. "The material it presents has been very well selected and expertly treated."—J. O. Frank.

**Fundamentals in High School Science Teaching.** E. E. Bayles. Central Missouri State Teachers College. Bulletin, December, 1927. Warrensburg, Mo. 60c.

A suggested reorganization of the content of the high school science courses on the basis of pupil understanding rather than of the subject matter itself.

**Principles of Science Teaching.** G. R. Twiss. Macmillan Co., 60 Fifth Ave., New York City. 1917. Revised 1927. \$2.00.

An able discussion of the function and value of science as part of education, and methods of teaching the special sciences. "Full of common sense suggestions . . . a corrective for many persistent faults of methods." (Educational Review.) List of references with each chapter. A copy should be readily at hand for every science teacher.

**Reorganization of Science in Secondary Schools.** Bulletin 1920, No. 26, U. S. Bureau of Education. Superintendent of Documents, Washington, D. C. 10c.

A committee report which has had a wide influence on the teaching of science in high schools. Every science teacher should have his own well-thumbed copy.

**Science Department Meetings.** The School Review, 35:428-447, June 1927. University of Chicago Press, Chicago, Ill. \$2.50 a year; 30c a copy.

An article by Alexander Brodell of the Franklin K. Lane High School, Brooklyn, N. Y., which gives suggested outlines for departmental meetings for each month of the school year. Excellent references for each discussion topic.



**Teaching Science in the Schools.** John Brown. University of London Press, 1925. 3s. 6d.

Interesting for comparing the British and American points of view. It gives suggestions for presenting science so that it will be related to everyday life. Very stimulating.

**Teaching Science in the Schools.** E. R. Downing. University Chicago Press, Chicago, Ill. 1925. \$2.00.

A summary of the results of educational experiments in science teaching. Includes chapters on the history of science teaching; present conditions; aims; principles; methods; tests in science; and science teaching in Europe. Bibliography with each chapter.

**The Teaching of Science and the Science Teacher.** H. Brownell and F. B. Wade. The Century Co., 353 Fourth Ave., New York City. 322 pp. 1925. \$2 00.

Discusses the preparation of the science teacher, and classroom and laboratory methods in each of the sciences. Emphasizes the science teacher as a builder of character

**Broad Lines in Science Teaching.** F. Hodson. Macmillan Co. 268 pp. 1910. Out of print; consult in library.

Principles and methods applicable to science teaching in general.

**The Grammar of Science.** Karl Pearson. Macmillan Co. 2 Vols. 1915. Out of print; consult library files.

One of the pioneers in pointing out the applications of statistical methods in science.

**Teaching of Science.** John F. Woodhull. Macmillan Co., 60 Fifth Ave., New York City. 1918. \$1.80.

Discusses the place of science in education. Deals with principles, rather than methods.

**Supervised Study in Science and Mathematics.** S. Clayton Sumner. Macmillan Co., 60 Fifth Ave., New York City. 1922. \$1.40.

An extended application of a special method to certain lessons in the high school sciences.

**Laboratory Arts.** Woolatt. Longmans, Green and Co., 55 Fifth Ave., New York City. \$1.00.

A teacher's handbook of laboratory management.

**Relative Effectiveness of Demonstration and Laboratory Methods in Science.** F. A. Riedel. *School Science and Mathematics*, 27:512-518; 620-631, 1927. Mount Morris, Ill. 35c a copy.

A summing up of all the studies on this point to date, with a critical analysis of their significance and suggestions for much further investigation.

**Science Teaching in a Democracy.** E. E. Slosson. *School Science and Mathematics*, 24:569-577, 1924. Mount Morris, Ill. 35c a copy.

A discussion every science teacher should read carefully.

**Teacher's Book for Individual Work in Science.** Herbert McKay. University of London Press, 17 Warwick Square, E. C. 4, London, England. 3s. 6d.

A handbook of directions for this series of textbooks, giving apparatus lay-outs, problems and experiments, with a teacher's notebook.

**The Teaching of the Scientific Method.** H. E. Armstrong. Macmillan Co. 504 pp. 1910. Out of print; consult library files.

Collected essays on science education.

**Abuse of the Scientific Method in the Teaching of Science.** W. H. Buxton. Published by Author, Whitworth College. Spokane, Wash., 1927. Paper, 50c.

Science teachers should be examples of scientific method, but seem not to be, according to this author.

**The Scientific Habit of Thought.** Frederick Barry. Columbia University Press, Broadway at 116th St., New York City. \$3.00.

A discussion of the nature of fact and of the philosophy of science.

**Aims and Methods of Nature Study.** Rennie and Thompson. Warwick and York Co., Baltimore, Md. \$1.70.

Discusses principles and gives workable plans for classroom use in teaching about objects and phenomena in the realm of Nature.

**Hand Book of Nature Study.** Anna B. Comstock. Comstock Publishing Co., Ithaca, N. Y. 1927. \$4.00.

"The seventeenth edition of the most completely descriptive book of Nature." Based on the widely known "Cornell Leaflets," it includes, in addition, many teaching helps.

**How to Teach Nature Study.** A. M. Kellogg. G. P. Brown and Co., Beverly, Mass. Illustrated, 62 pp. Linen, 25c.

A brief teaching manual, with outlines for each month of the year.

**The Nature Almanac.** A. N. Pack and E. L. Palmer. American Nature Association, 1212 Sixteenth St., N. W., Washington, D. C. \$1.00.

"Indispensable reference to the teacher of nature study. Tells clearly just how others are succeeding in the nature program over the nation. Full of practical outlines, book lists, etc."—H. A. Webb.

**Nature Guiding.** W. G. Vinal. Comstock Publishing Co., Ithaca, N. Y. \$3.50.

A wealth of nature lore, with practical suggestions for teaching in camps, national parks, and school gardens, and an outline of nature study by grades. Much useful information. Urges first-hand acquaintance with nature materials. Well illustrated.

**The Teaching of Nature Study.** Von Wyss. Black, London, and Macmillan, New York City. 101 pp. 1927. \$1.75.

The meaning of nature study and its relation to science. General principles and practical experiments for the classroom.

**How to Teach Agriculture.** A. V. Storm and K. C. Davis. J. B. Lippincott Co., Washington Square, Philadelphia, Pa. 1921. \$3.50.

A textbook of methods, for use in training schools and for the teacher in service.

**Nature Teaching Based on the Principles of Agriculture.** F. Watts and W. G. Freeman. E. P. Dutton and Co., 681 Fifth Ave., New York City. \$1.75.

A handbook of materials and methods for teachers of Agriculture and Nature Study.

**Materials and Methods in High School Agriculture.** W. G. and B. R. Hummel. Macmillan Co., 60 Fifth Ave., New York City. \$1.80.

Illustrated. A textbook with many useful aids to teachers in rural schools.

**Teaching Agriculture in the High School.** G. A. Bricker. Macmillan Co., 60 Fifth Ave., New York City. \$1.60.

Suggestions on practical ways of doing things.

**Teaching Agricultural Vocations.** Stewart and Getman. John Wiley and Sons, Inc., 440 Fourth Ave., New York City. 377 pp. 1927. \$3.00.

A manual of methods for teachers in preparation and in service

**How to Teach General Science.** J. O. Frank. P. Blakiston's Sons, Philadelphia, Pa. 1926. \$2.00.

Designed primarily to assist teachers in classroom instruction; contains many teaching helps. Traces the history of general science teaching; discusses the preparation of the teacher and the conduct of recitation; gives practicable suggestions, formulas for laboratory materials, and lists of aids. Includes a score card with criteria for evaluating textbooks.

**Teaching of General Science.** W. L. Eikenberry. University of Chicago Press, Chicago, Ill. \$2.00.

Not a manual of classroom methods. Discusses the principles underlying the teaching of general science and the position of this subject in education. Of value to the teacher of any science course.

**Plan Book for Teaching General Science.** V. Smith. Published by Author, 2034 Pasadena Ave., Long Beach, Calif. 1925. Paper, \$1.75.

A detailed syllabus, based on Snyder's "Everyday Science." Contains many suggestions, anecdotes, thought questions, etc. Useful to a general science teacher.

**Biology in the Secondary Schools, and the Training of Biology Teachers.** Charles W. Finley. Bureau of Publications, Teachers College, Columbia University, New York City. \$1.50.

Traces the changing emphasis in the teaching of the biological sciences.

**The Teaching of Biology.** F. E. Lloyd and M. A. Bigelow. Longmans. 491 pp. 1907. Out of print; consult in library.

A book of methods for the secondary school.

**The Teaching Botanist.** W. F. Ganong. Macmillan Co., 60 Fifth Ave., New York City. New ed., \$2.25.

A manual of information on methods of teaching.

**Teaching the Social Studies.** Edgar Dawson. Macmillan Co., 60 Fifth Ave., New York City. 405 pp. 1927. \$2.00.

In addition to the expected chapters on history and geography, etc., is one by Holmes on biology.

**What Is Osmosis?** O. K. Stark. In "Science," June 1, 1928, p. 556. Grand Central Terminal, New York City. 15c.

Simply explained facts on this well-nigh universal process, the nature of which is so frequently misunderstood by pupils because it is often mistaught. Suggests how to teach this topic.

**High Schools and Sex Education.** Edited by Benjamin C. Gruenberg. U. S. Public Health Service. Now available through The American Social Hygiene Association, 370 Seventh Ave., New York City. 50c.

Suggestions for correlation with courses in biology, hygiene, English, etc. Outlines of topics, physical record blanks, bibliography, also other booklets: "The Teacher and Sex Education," Benjamin C. Gruenberg; "Sex Hygiene for Teachers and Parents," C. E. A. Winslow and P. B. Williamson; "Introduction of Sex Education into Public Schools," Thomas M. Bailliet. 10c each.

**Sex Education.** M. A. Bigelow. Macmillan Co., 60 Fifth Ave., New York City. 1916. \$1.50.

Clear exposition of the problems, aims, and methods of sex education.

**Certain Phases of the Administration of High School Chemistry.** W. W. Carpenter. Bureau of Publications, Teachers College, Columbia University, New York City. \$1.50.

An analysis of the responsibilities of the head of a department in a high school science. Of value to all administrators who are interested in science teaching.

**Teaching First Year Chemistry.** J. O. Frank. Published by the Author, State Teachers College, Oshkosh, Wisc. 4th Edition. \$1.50.

Discusses value and aims of high school chemistry, and gives detailed, practical suggestions on laboratory equipment. Separate chapters on teaching chemistry in college. Good bibliography.

**The Teaching of Chemistry and Physics.** A. Smith and E. H. Hall. Longmans, Green and Co. 377 pp. 1913. Out of print; consult in library.

One of the earliest and best attempts to share the secrets of successful science teaching.

**How to Study—Illustrated Through Physics.** Fernando Sanford. Macmillan Co., 60 Fifth Ave., New York City. 56 pp. 1922. 80c.

The historical approach in teaching the scientific method of solving problems.

**How to Teach Physics.** R. D. Rusk. J. B. Lippincott Co., Washington Square, Philadelphia, Pa. 1923. \$1.80.

Discusses the place of physics in modern education and gives a short historical account of the subject. Takes up the actual teaching under the heads: scientific method, practical physics teaching, classroom material, laboratory course, vitalizing the course, apparatus, common mistakes, and grades and tests.

**The Teaching of Physics.** C. R. Mann. Macmillan Co., 60 Fifth Ave., New York City. 304 pp. 1912. \$1.80.

Includes history of science teaching, discusses the place of science and other principles, and gives practical suggestions.

**History of Science Teaching in England.** D. M. Turner. Chapman and Hall, 11 Henrietta St., London, W. C. 2, England. 1927. 7s. 6d., net.

The dawn of the scientific spirit, the beginnings of science teaching in the universities and schools, and the meaning of science in present education. An excellent survey. Bibliography and index.

**Science and Learning in France.** Editor, John H. Wigmore. The Society for American Fellowships in French Universities, 31 West Lake St., Chicago, Ill. 1917. \$1.50.

A survey of opportunities for American students in French universities. Each science field treated separately. Many portraits of scientists.

**BOOKS ON THE TEACHING OF SCIENCE.** (Add other materials in space below.)

## C. BIBLIOGRAPHY OF BIBLIOGRAPHIES

### Lists of Illustrative Materials

**Accredited Booklets.** Free. The Farm Journal, Washington Square, Philadelphia, Pa. Free.

A good list of free pamphlets from many sources, which may be ordered from this office.

**Aids in the Teaching of Geography.** Harriet Smith. Sam Houston State Teachers College, Huntsville, Texas. 1926. 15c.

List books, supplies, and illustrative materials.

**A Bibliography of Geographical Literature.** Ella B. Knight, Dept of Geography, Clark University, Worcester, Mass. 25c.

Although for elementary and junior high school, it contains information of value to any science teacher.

**Educational Exhibits: A Neglected Opportunity.** Geo. R. Ranow. Educational Administration and Supervision, 9:499-505, November 1923. \$3.00 a year; single copy, 50c. Warwick and York, Inc., York, Pa.

Gives suggestions and list of addresses.

**Free and Inexpensive Science Equipment.** School Science and Mathematics, January 1927, pp. 34-39. Mount Morris, Ill 35c a copy.

An excellent discussion of the use and care of illustrative materials.

**Free Pamphlets of Use to Science Teachers.** The Science Classroom, Vol. V, January to June, 1926; Vol. VI, June 1928; Vol. VIII, September 1928 (a revised list). 250 Fourth Ave., New York City. 25c a year; 3c a copy.

Excellent for general science.

**Free Material for Geography Teaching.** Mary Josephine Booth, Librarian, Eastern Illinois State Teachers College, Charleston, Ill. 101 pp. 50c.

Valuable not only for geography teachers but also for any science teacher.



**Illustrative Material.** Fay Griffith and Mamie O. Lott. Published by authors, Normal School, Terre Haute, Ind. 50c.

Very useful lists of bulletins, pamphlets, exhibits, pictures, etc. Much of the material listed is free; otherwise, prices are noted. Good directions on how to order and how to care for materials are included. Intended primarily for science teaching in elementary and junior high school levels.

**List of Chemistry Materials.** In "Teaching First Year Chemistry," pp. 85-88. J. O. Frank, Oshkosh, Wisc. \$1.00.

Special lists of free and inexpensive materials; also information as to how and where to buy equipment

**Lists of Dealers in Equipment and of Reference Books.** In Twiss, "Science Teaching," pp. 182-186; 216-224, 461-479 Macmillan Co., 60 Fifth Ave., New York City. \$2.00.

**Lists of Equipment for Biology.** In "Teacher's Manual for New Civic Biology," by Geo. W. Hunter. American Book Co., 81 Lexington Ave., New York City. 60c.

A brief list, but it contains the essentials of an adequate biology equipment.

**List of Exhibits and Publications on Industrial Processes.** Industrial Arts Coöperative Service, 1256 Amsterdam Ave., New York City. Free.

Can be used very well for general science.

**Lists of Firms Sending Free Materials to Teachers.** Bulletin No. 2. University Apparatus Co., Berkeley, Calif. 30c.

**Reference Materials in High School Chemistry.** L. F. Foster. Same address as preceding item. 20c.

These two bulletins are among the first lists of illustrative materials and may still serve as models.

**List of Free Geographical Materials.** Chicago Schools Journal, February 1924. 25c.

**Materials for School Activities.** By Ellis C. Persing. School Service Bulletin. Experimenter Publishing Co., 230 Fifth Ave., New York City. 20c a year.

Beginning June 1928, serially. Good preface. Lists chiefly free materials. Arranged by topics.

**Safety Bibliography for Teachers and Pupils.** National Safety Council, 120 West 42nd St., New York City; or 108 East Ohio St., Chicago, Ill. Free.

A worthwhile list of publications in this important field.

**The Science Teacher At Work.** Scott, Foresman and Co., Chicago, Ill. Free.

A small 16-page booklet, by the authors of a well-known general science text, with an interesting discussion of the problems of the science teacher. Contains reference list of books, pamphlets at end.

**Sources of Free Material for Science Instruction.** By Ralph E. Dunbar. *General Science Quarterly*, May 1928, p. 551. Salem, Mass. 40c a copy.

A good list of addresses with excellent suggestions on the ordering and use of free materials.

**Sources of Free Material for Use in the Teaching of Natural Science.** *Bulletin*, n.s. No. 314, Aug. 1, 1925. With Supplement. University of Oklahoma, Norman, Okla. Free.

Lists materials of many types, with excellent suggestions on care in ordering them.

**Special Teaching Aids.** In "How to Teach General Science." J. O. Frank. P. Blakiston's Sons, Philadelphia, Pa. \$2.00.

Chap. XVI, pp. 162-167. Lists of science books, periodicals, etc., for the school library and for the science teacher.

Chap. XIX, pp. 194-235. Special teaching aids: booklets and exhibits from industrial firms, most of them free; what apparatus and supplies to buy and where; how to make black acid-proof finish for table-tops, screen, hectograph, etc.

**Teachers Guide Book for Everyday Problems in Science.** Pieper and Beauchamp. Esp. pp. 279-321. Scott, Foresman Co., Chicago, Ill. 60c.

Part III includes detailed lists of equipment and supplies, with cost; also suggestions on how to order and care for apparatus and supplies. Part IV, lists of reference books for pupils. Part V, publications for the science teacher.

**Use of Illustrative Material in Teaching Agriculture.** Div. of Agriculture Instruction, U. S. Department of Agriculture, Superintendent of Documents, Washington, D. C. 10c.

Of value to all science teachers for suggestions concerning many types of supplementary aids to teaching.

**Publications of Commercial and Scientific Organizations**

**The Mentor Magazine.** Single Sales Dept., Springfield, Ohio.  
 "List of Back Issues in Print." Free.

Many in the list are of science interest; for example, No. 267—C. P. Steinmetz; No 268—Giant Birds. 35c a copy.

**Books for the High School Library.** Harcourt, Brace and Co.,  
 383 Madison Ave., New York City. Free

Includes brief but good section on science.

**Books on Tuberculosis.** For sale by The Journal of the Outdoor Life, 370 Seventh Ave., New York City.

**Bulletins on Mazda Lamps and Lighting Practice.** Edison Lamp Works of General Electric Co., Harrison, N. J. Free.

Describes in some detail the Lighting Data Bulletins which are obtainable free from this company.

**Classified List of Publications.** The Carnegie Institution of Washington, Washington, D. C

Lists for the most part technical papers and reports of researches

**Classified List of Publications.** Natural History Survey Division, State Department of Registration and Education, Urbana, Ill. Free.

Includes titles of publications of the Illinois State Entomologist's Office and the State Laboratory of Natural History, up to January 1927.

**Cleanliness Bibliography.** Cleanliness Institute, 45 East 17th St., New York City. 20c.

**Educational Bulletin.** Proctor and Gamble, Educational Dept., Cincinnati, Ohio. Free.

A check list of bulletins which are issued to teachers and which are for the most part sent without cost.

**Fire Prevention.** Pyrene Manufacturing Co., 560 Belmont Ave., Newark, N. J.

Numerous publications on this topic, the most valuable being "Making Schools Safe from Fire," an 80-page pamphlet. This company also puts out a two-reel motion picture entitled, "Fortify for Fire Fighting."

**Free Publications.** Evaporated Milk Association, 231 South LaSalle St., Chicago, Ill.

Lists 24 pamphlets on the use of canned milk.

**Guide to Material Descriptive of Many Lands and Peoples.** Education Dept., League of Nations Non-Partisan Association, 6 East 39th St., New York City. 25c.

**Health Education Material.** National Dairy Council, 307 North Michigan Ave., Chicago, Ill. Free.

Lists of posters, projects, booklets, plays, stories, exhibits, lantern slides, film strips, and motion pictures; also directions for ordering them.

**Health, the First Objective in Education.** School Health Bureau, Metropolitan Life Insurance Co., 1 Madison Ave., New York City. Free.

Gives a list of their many free leaflets and booklets.

**List B.** The International Nickel Co., 67 Wall St., New York City. Free.

A 4-page leaflet, listing many free publications dealing with various uses and tests on nickel and monel metal.

**Lists of Booklets, Charts, Pictures, and Lantern Slides.** International Harvester Co., 606 South Michigan Ave., Chicago, Ill. Free.

Four leaflets. "I. H. C. Booklet Catalog," "All Our Service Is Yours," "I. H. C. Lecture Charts, Lantern Slides and Motion Pictures," and "What's an I. H. C. Short Course?"

**List of Available Publications.** Agricultural College, University of Illinois, Urbana, Ill.

**List of Publications.** American Red Cross, Washington, D. C.

**List of Publications.** The Eye Sight Conservation Council, Times Bldg., New York City. Free.

**Lists of Publications.** Circular No. 46. New York State College of Forestry, Syracuse, N. Y. Free.

Includes publications of the Roosevelt Wild Life Station.

**List of Publications.** New York State Museum, Albany, N. Y. Free.

Pamphlets and booklets on Geology, Botany, etc., of New York State.

**List of Publications.** Playground and Recreation Association of America, 315 Fourth Ave., New York City. Free.

Includes books, pamphlets, charts, etc.

**List of Publications** of the Science Masters Association. Geo. Bell and Sons, Ltd., York House, Portugal St., London, W. C. 2, England. Free.

**List of Publications.** H. R. Mitchell, Chief Clerk, Zoölogical Park, 185th St., and South Blvd., New York City. Free.

**Little Blue Books.** Haldeman-Julius Co., Girard, Kansas. Free.

A catalog. Many of these little volumes give concise information on science topics. Some of the titles in science are:

- No. 167—"Everyday Rules of Health."
- No. 278—"Quacks and Quackeries."
- No. 794—"Facts You Should Know about Patent Medicines."
- No. 136—"Measles, Diphtheria, etc."
- No. 870—"Tuberculosis: Its Cause and Prevention."
- No. 875—"Diabetes: Cause and Treatment with Insulin."
- No. 680—"Pasteur—Benefactor of Humanity."
- No. 853—"How to Know the Song Birds."
- No. 873—"Dwellers of the Ponds."
- No. 710—"Botany Self-Taught."
- No. 897—"Astronomy for Beginners."
- No. 1185—"All about the Weather."
- No. 493—"Novel Scientific Facts and Experiments."
- No. 452—"Dictionary of Scientific Terms."

**Material Prepared for School Use.** N. J. Public Utility Information Committee, 432 Market St., Camden, N. J. Free.

**Medical Subjects of Interest to the Public.** Price list. American Medical Association, 535 North Dearborn St., Chicago, Ill. Free.

Lists books, pamphlets, plays, posters, and lantern slides on health topics.

**New York Aquarium Nature Series.** The Aquarium, New York City. Free.

A series of publications on this subject. Sea Shore Life, \$1.25; and other books dealing with marine life.

**Popular Publications.** American Museum of Natural History, 77th St. and Central Park West, New York City. Free.

A check list of the Museum's handbooks and guide leaflets.

**Price List of Literature.** National Association of Audubon Societies, 1974 Broadway, New York City. Free.

Lists many leaflets, pamphlets, pictures, charts, and books.

**Publications.** American Association for Medical Progress, 370 Seventh Ave., New York City. Free.

Many of those listed are free and are valuable in teaching health, combating superstition, etc.

**Publications on Physics and on the Teaching of Natural Science.** Bulletin, n.s. No. 344. University of Oklahoma, Norman, Okla. Free.

Lists many interesting bulletins, along not only pedagogical but also general lines.

**Publications on Preventing Blindness.** National Committee for the Prevention of Blindness, 370 Seventh Ave., New York City. Free.

A list of 24 books and several magazines and articles.

**Recent Publications of Special Interest.** Pan-American Union, Washington, D. C. Free.

The list includes a number of five-cent booklets on the products of Latin-American countries.

**References on Child Health.** American Child Health Association, 370 Seventh Ave., New York City. Free.

Lists books and pamphlets, some of which are free.

**Price List of Illustrated Leaflets.** Field Museum of Natural History, Chicago, Ill. Free.

Ask also for general catalog.

**Services Offered.** Bulletin No. 40. National Child Welfare Association, 70 Fifth Ave., New York City. Free.

A leaflet describing their publications, posters, lectures, etc.

**Through Books to Nature.** Comstock Publishing Co, Ithaca, N. Y. Free.

A catalog of books, drawings, and other material dealing with nature subjects

**What to Read on Social Hygiene.** No. 242 and No. 263. The American Social Hygiene Association, 370 Seventh Ave., New York City. Free.

A list of available pamphlets on this important topic.

### Lists of Government Publications

Superintendent of Documents, Government Printing Office, Washington, D. C.

Price lists which may be of interest to science teachers:

No. 11—Foods and Cooking.	No. 44—Plants.
No. 15—Geological Survey.	No. 45—Roads.
No. 16—Farmers' Bulletins.	No. 46—Soils and Fertilizers.
No. 18—Engineering and Surveying.	No. 48—Weather, Astronomy, Meteorology.
No. 21—Fishes.	No. 51—Health.
No. 25—Transportation.	No. 53—Maps.
No. 31—Education.	No. 55—National Museum.
No. 35—Geography and Explorations.	No. 58—Mines.
No. 38—Animal Industry.	No. 60—Alaska.
No. 39—Birds and Wild Animals.	No. 62—Commerce and Manufactures.
No. 40—Chemistry.	No. 64—Standards of Weights and Measures.
No. 41—Insects.	No. 68—Farm Management.
No. 42—Irrigation, Drainage, Water Power.	No. 69—Pacific States.
No. 43—Forestry.	No. 71—Children's Bureau.

Special lists are available; for example, Radio, etc.

**Monthly Catalog of U. S. Public Documents.** Supt. of Documents, Washington, D. C. 50c a year.

**Monthly List of State Publications.** Superintendent of Documents, Washington, D. C. \$1.00 a year.

**Guide to U. S. Government Publications.** Bulletin 1918, No. 2, Bureau of Education. Order of Supt. of Documents, Washington, D. C. 20c.

**Record of Current Educational Publications.** Bureau of Education, Washington, D. C. Quarterly. Price varies usually 10c.

**Government Publications Useful to Teachers.** Bulletin 192 No. 23, Bureau of Education. Order of Supt. of Documents Washington, D. C. 10c.

**Publications of Special Interest to High School Teachers.** Leaflet April, 1927. U. S. Bureau of Education, Washington, D. C. Free.

**Material of Interest to Teachers.** Forest Service, Washington, D. C. Free.

Mimeographed sheets, giving publications of this service, and other helps.

**Uncle Sam's Guides to Health.** Miscellaneous Publication No. 20, U. S. Public Health Service, Washington, D. C. Free.

A list of the popular health leaflets issued by this service.

### United States Government

Each of the following agencies of the United States Government issues lists of publications, and many of them supply circulars describing their activities and functions:

Agriculture, Department of	Fisheries, Bureau of
Agricultural Instruction, Division of	Fisheries Commission
Animal Industry, Bureau of	Forest Service
Biological Survey	Geological Survey
Census Bureau	Mines, Bureau of
Chemistry and Soils, Bureau of	National Museum (Smithsonian Institution)
Coast and Geodetic Survey	National Observatory
Commerce, Department of	National Parks Service
Dairy Industry, Bureau of	Pittsburgh Experiment Station, Bureau of
Engineering, Bureau of	Mines
Navy Department	Plant Industry, Bureau of
Entomology, Bureau of	Public Health Service
Ethnology, Bureau of	Signal Office
Experiment Stations, Office of	Standards, Bureau of
	Vocational Education, Federal Board for
	Weather Bureau



**Bibliography of Scientific Literature Relating to Helium.** Bureau of Standards Circular No. 81, Superintendent of Documents, Washington, D. C. 10c.

Good reference list in a restricted field.

**Sources of Elementary Radio Information.** Bureau of Standards Circular No. C-122, 1923. 16 pages. Superintendent of Documents, Washington, D. C. 5c.

A list of books, periodicals, etc., giving such information. Some books rather old now.

**Annual Report.** U. S. Department of Agriculture, Washington, D. C.

Contains much valuable information for science teachers. Get your congressman to have it sent to your high school library.

**Publications for General Distribution.** Cornell Extension Bulletin No. 47. Office of Publications, State College of Agriculture, Ithaca, N. Y. Free.

Lists many bulletins on science applications in the home and on the farm.

**State Material.** Free.

Send for catalogs and bulletins issued by the departments below. Every teacher should get in touch with the excellent free material distributed by the various state educational organizations:

State Department of Education.

State Library Association.

State University—Library, Bureau of Visual Education,

The Extension Division, School of Education.

Agricultural Experiment Stations.

State Museums.

State Department of Vital Statistics.

State Department of Health.

State Fish and Game Commission.

State Forester.

**List of Official Publications.** Board of Education, Whitehall, London, S. W. 1, England. Free.

Includes (p. 4) "Natural Science in Education," 1s. 8½d., and (p. 16) "Natural Science in Adult Education," 7d.

### Lists of Films

**List of Free Films.** Acme Motion Picture Projector Co., 1132 West Austin Ave., Chicago, Ill. 25c.

**List of Free Films.** Erker Bros. Optical Co., 608 Olive St., St. Louis, Mo. Free.

**List of Industrial Motion Pictures.** General Science Quarterly, 12:484-486, March, 1928. Salem, Mass. 40c per copy.

**List of Non-Theatrical Distributors.** National Board of Review of Motion Pictures, 70 Fifth Ave., New York City. Free.

**Motion Pictures of the U. S. Department of Agriculture.** Miscellaneous Circular No. 86, 1926. Superintendent of Documents, Washington, D. C. 10c.

**One Thousand and One.** The blue book of non-theatrical films. Educational Screen, 5 South Wabash Ave., Chicago, Ill. 75c.

Undoubtedly the most complete list of educational motion pictures published. Revised annually. Brief comments on each title.

**Some Commercial Companies from Which Educational Films May Be Obtained.** Mimeographed. U. S. Bureau of Education, Washington, D. C. Free.

### General Bibliographies

**The American Educational Catalog.** The Publishers' Weekly, 62 West 45th St., New York City. Paper, 50c; limp cloth, \$1.00.

A very complete annual list of textbooks.

**Books for the High School Library.** Harcourt, Brace and Co., 383 Madison Ave., New York City. Free.

Includes brief but good section on Science.

**Catalog of New and Used Educational Books.** Missouri Store Co., Columbia, Mo.

Most of the titles offered are science books.

**Catalog of School and College Textbooks.** Baker and Taylor Co., 55 Fifth Ave., New York City. Free.

Textbooks from many firms are listed.

**The High School Library.** Hannah Logasa. D. Appleton and Co., 35 West 32nd St., New York City. \$1.75.

A study of the functions of the school library as a correlating and unifying agency. Indicates practical way in which the library can be useful in science and in other school activities and means for increasing voluntary reading.

**List of Educational Subject Headings.** Ed. by L. Belle Voegelien, with Committee on the Classification of Educational Materials of the N. E. A. Ohio State University Press, Columbus, O. 337 pp. \$5.00.

A comprehensive but adaptable scheme for classifying and indexing educational books, periodicals, bulletins, and material of all types.

**One Thousand Useful Books.** American Library Association, 78 East Washington St., Chicago, Ill. 1924. Free.

Good sections on Agriculture, Hygiene, and Natural Science, among other topics.

**Periodicals for the Small Library.** American Library Association, 78 East Washington St., Chicago, Ill. 50c.

Lists most desirable magazines and gives descriptive notes. A list of magazines for a school library is given in Martha Wilson's "School Library Management." 1925 ed.; pp. 24-26.

**School Library Yearbook.** No. 1, 1927. American Library Association, 78 East Washington St., Chicago, Ill. No price given.

Science teachers should know how to encourage the proper use of the school and public library. Here is expert guidance.

**Standard Catalog for High School Libraries.** Ed. by Zaidee Brown. H. W. Wilson Co., 963 University Ave., New York City. Sold on service basis. Write for rates.

Expert aid in choosing books, pamphlets, and pictures; complete author, title, and subject index. There are 2600 entries; 1000 of these are starred as important, and 200 double starred as essential for every school library. Good sections on the sciences.

### Lists of Science Books

**Agriculture and Country Life.** U. S. Bureau of Education, Washington, D. C. Free.

This is Reading Course No. 22. Lists books and pamphlets. Ask for complete series of reading courses.

**American Chemical Society, Fifth Prize Essay Contest.** 1927-28. Committee on Prize Essays, 85 Beaver St., New York City. Free.

Booklet containing contest rules, excellent bibliography, list of winners in previous contests, etc.

**Bibliography of Recent Literature on the Teaching of Geography.** Frederick K. Branom. Home Study Dept., Clark University, Worcester, Mass. 1925. 15c.

Books and articles in periodicals are listed.

**Bibliography of Science Teaching in Secondary Schools.** Earl R. Glenn and Josephine Walker. Bulletin 1925, No. 13, U. S. Bureau of Education. Superintendent of Documents, Washington, D. C. 20c.

A complete index; no annotations. Covers important magazines of science field.

**Bibliography of Scientific Books.** Woman's Department, National Civic Federation, 105 West 40th St., New York City. 1927; and Supplement for 1928. Free.

A list selected by Otis W. Caldwell, Vernon Kellogg, and E. E. Slosson.

**Biology.** Vernon Kellogg. Reading with a Purpose Series, American Library Association. 35c at local library.

A guide to some outstanding books in this field. Can be obtained at local public library.

**Books for Plant Study.** Circular No. 14. Wild Flower Preservation Society, 3740 Oliver St., N.W., Washington, D. C. 5c.

A classified list of books on various botanical topics. Also ask for circular No. 6. Free. Lists of wild flowers which are rare, fairly common, and common.

**Books for a Science Library.** University of Chicago Press, Chicago, Ill. Free.

A catalog of publications in many fields of science. A valuable list.

**Books for the Science Library.** An appendix in "Teaching Science in Schools" by John Brown, University of London Press, 17 Warwick Sq., E. C. 4, London, England. 3s. 6d.

An extensive list of books in all science fields arranged by subjects and types of reference.

**A Brief Bibliography of Eugenics.** American Eugenics Society, 185 Church St., New Haven, Conn. Free.

Condensed from "A Bibliography of Eugenics," by S. J. Holmes, University of California Press, Berkeley, Calif

**Chemistry Books for the High School Library.** James H. Walton. School Science and Mathematics, 25:390-394. 1925. Mt. Morris, Ill. 35c a copy.

A general discussion followed by a classified list of books, with author, publisher, and prices.

**Children and Adult Summer Activities in Science.** By Gerald S. Craig, Horace Mann School of Teachers College, Broadway at 120th St., New York City. 5c for postage.

A mimeographed outline of topics, with references for children and for adults.

**Electricity in the Home.** Belle Boone Beard. The Workers Education Bureau Press, 476 West 24th St., New York City. 173 pp. 1927. \$1.00.

An annotated list of references in books and periodicals to writings which treat of the many kinds of household electrical appliances.

**First Glances at New Books.** In "Science News-Letter," 21st and B Sts., N.W., Washington, D. C. \$5.00 a year.

This valuable department gives brief pointed reviews of science books. Another department in the same periodical, "Classics of Science," gives reprints of famous experiments in various fields. This magazine also contains articles on recent developments in science.

**Good Reading in Popular Science.** Williams and Wilkins Co., Baltimore, Md. Free.

Interesting books for any reader. Also, "Check List of Books on Biology."

**The High School Science Library.** H. A. Webb. George Peabody College for Teachers, Nashville, Tenn. For 1910-1924, 25c; 1925, 10c; 1926, 10c; 1928, 10c.

These booklets (now issued annually) list nearly 200 titles, annotated and classified into price groups. Extensive list of addresses of publishers. Very carefully compiled. Criteria for judging books given in the first issue. The best list published.

**List of Books on the History of Science.** John Crerar Library, 86 East Randolph St., Chicago, Ill. 297 pp. 25c.

An extensive list of works in English, French, and German. This is a second edition. Does not include the applied sciences.

**List of Books Suitable for School Science Libraries.** George W. Bell and Sons, York House, Portugal St., London, W. C. 2, England. 1s. 1d. 1925.

Chiefly British books, but a valuable list for use in the United States also.

**A List of Reference Books in Science for High Schools.** Bulletin No. 36. Dept. of Public Instruction, Commonwealth of Pennsylvania, Harrisburg, Pa. 5c.

Arranged by subjects, with brief pointed comments.

**List of State Tree Guides.** The Science Classroom, May, 1928, p. 9, and June, 1928, p. 8. 250 Fourth Ave., New York City. 3c per copy.

Most of the tree guides listed are free.

**Nature Books.** Comstock Publishing Co., Ithaca, N. Y. Free.

An excellent list of keys and other nature books reprinted from "The Handbook of Nature Study," by Anna Botsford Comstock.

**Our Greatest Offer.** The Chemical Foundation, 85 Beaver St., New York City. Free.

A leaflet describing eight popularly written books on chemistry which may be purchased for \$5.00.

**The Physical Sciences.** E. E. Slosson. Reading with a Purpose Series, American Library Association. 35c at local library.

Discusses the books to read if one wishes to "keep up with science." Can be obtained at local public library.

**Pivotal Figures of Science.** Bostwick. Reading with a Purpose Series, American Library Association. 35c at local library.

Outlines an appreciation of science through the approach of biography of the great scientists. Can be obtained at public library.

**Popular Books in Science.** American Library Association, 78 East Washington St., Chicago, Ill. Free.

A very well arranged list covering the many fields of science.

**Publicity Methods Reading List.** Russell Sage Foundation, 130 East 22nd St., New York City. 48 pp. 1924. 30c.

Selected references on publicity in social work, including public health.

**A Reading List on Science.** In "Adventures in Reading," by May Lamberton Becker, pp. 203-206. Frederick A. Stokes Co., 443 Fourth Ave., New York City. 1927. \$2.00.

This is a book full of worthwhile suggestions concerning books.

**Reference List of Library Books on Science.** Bulletin n. s. XXV, No. 2. University of Michigan, Ann Arbor, Mich. 25c.

Arranged by topics for schools and clubs.

**The Relation of the High School Library to the Teaching of Chemistry.** E. R. Glenn and Anne T. Eaton. Library Journal, May 1, 1923. R. R. Bowker Co., 62 West 45th St., New York City. \$5.00 per year; 25c a copy.

Good suggestions on the use of the library in teaching science.

**Science Books in the High School Library.** B. C. Hendricks. Library Journal, Vol. 52:1073-76, November 15, 1927. R. R. Bowker Co., 62 West 45th St., New York City. \$5.00 per year; 25c a copy.

Methods of stimulating interest in reading. Report on chemistry books in high schools; with selected list. Qualities of a good science book discussed.

**The Science Reference Library.** Grace M. Harper. School Science and Mathematics, 23:40-47, 1923. Mount Morris, Ill. 35c a copy.

**Science Service Books.** Science Service, 21st and B Sts., N.W., Washington, D. C. Free.

A list of books edited by the members of this service organized "for the popularization of science."

**Some Good Books in Science.** J. W. Sykes. The author, Carnegie Library, Ottawa, Canada. 1924. Free.

A well-selected list, topically arranged, with brief comment.

**Some Values Derived from Extensive Reading in General Science.** F. D. Curtis. Contributions to Education, No. 163. Bureau of Publications, Teachers College, Columbia University, New York City.

A study of ways to encourage reading by science students. Out of print, but available at most college libraries.

**The Stars.** Harlow Shapley. Reading with a Purpose Series. American Library Association, 78 East Washington St., Chicago, Ill. 35c.

Discussion of the best books on astronomy. May be purchased at your own public library.

**Suggestions for the High School Library.** In Menge, "Laws of Living Things," pp. 514 to 516. Bruce Publishing Co., Milwaukee, Wisc. 1927. \$1.72.

A valuable list of reference works on Biology.

**Supplementary Readings.** The Science Classroom, Vol. V, September, 1925-September, 1926. 250 Fourth Ave., New York City. 25c a volume; 3c a copy.

Lists of reference books on many science topics.

**Texts and References for Secondary Schools.** Division of Agricultural Instruction, U. S. Department of Agriculture, Washington, D. C. Free.

A series of mimeographed lists for the high school library on many science topics. Ask for the whole set and for other similar mimeographed lists of sources.



**BIBLIOGRAPHY OF BIBLIOGRAPHIES.** (Add other materials in space below.)



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